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# ***JPRS Report***

# **Science & Technology**

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***Europe/International  
Economic Competitiveness***

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# Science & Technology

## Europe/International

### Economic Competitiveness

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## SCIENCE & TECHNOLOGY POLICY

### Study Calls R&D Subsidy Benefits Poor

947WS0426A Duesseldorf VDI NACHRICHTEN  
in German No 25, 24 Jun 94 p 1

[Article by Peter Schwarz: "Does Research Promotion Meet the Needs?"]

[Text] A sharp critique of the present-day performance of the Brussels research promotion program is given in an investigation of the Koln consultation firm Scientific Consulting. According to the study, which was made on behalf of the German Research Ministry, and which involved questioning of more than 1500 participants in the Esprit Program (information and communication technology), more than two-thirds of those questioned have drawn "only minor or completely no benefit" from their participation.

The reason for this, other than the huge bureaucratic expenditures, is above all the poor ensuing results. Only each fourth project proposal was given a positive evaluation by the experts. The sum of 370 million German marks [DM] which the German enterprises and research establishments were granted from the Esprit Program contrasts to the total expenses for submitting proposals and development work between DM175 million and DM205 million, according to the Koln consultants.

It is particularly the smaller companies which are at a disadvantage, whose proposals, due to the short deadlines, seldom can compete with the better-informed large enterprises. The study sums it up: "The Esprit program, with the current way of doing things, is more a highly organized distribution process for R&D resources with enormous distribution costs than an effective R&D Program."

This is a view with which Horst Waltring, the director of the National Coordination Center for the European Research Promotion Program, does not concur. Without question the costs of presenting proposals are too high, but on the other hand the participation in the European Research Promotion Program has advantages which are not easily reckoned in marks and pfennigs. In many cases there have been cooperative efforts which have arisen during the proposal process, even without promotion money being advanced, or the contacts have been used in new marketing and retail trade directions. Waltring: "The Brussels programs see to it that in Europe the barriers will fall away and researchers from the different European countries will get to know one another." This "political value added" stands completely aside from the economic considerations. The increasing participation in the programs indicates that the overall benefit has been positively evaluated by the participants.

Due to the massive criticism of the prevailing promotion practice the responsible parties have drawn certain conclusions. For the fourth space program, for which the first call for proposals will be published in December of this year, EU commissioner Roberti announces the following changes:

—In order to reduce the high proposal costs a two-step procedure will be introduced. Those interested will first

submit an outline of the project. Those applicants who have chances for approval will be asked to provide a complete proposal.

—In the future, during the course of the program, proposals will be accepted every three months. Previously proposals had been accepted only at firmly set times.

—In addition, in the future, calls for proposals will be written up for specific themes so as to forestall many proposals which would have no chance of approval.

### EU: Prospects of Information Superhighway Development Analyzed

94WS0481A Paris 01 INFORMATIQUE in French  
8 Jul 94 pp 15-17

[Article by Jean Pierre Soules: "Information Superhighways: Europe Joins the Race"—first paragraph is 01 INFORMATIQUE introduction]

[Excerpts] Information superhighways are the talk of the town. But definitions of what they are and how they ought to be implemented vary depending on who is talking. At a time when European countries are about to pool their efforts where infrastructures are concerned, the French players (operators, cable operators, service companies) expect the They report to provide them with development guidelines.

In recent months, there has been a lot of talk about information superhighways. But are we all talking about the same thing? Figures are being put forward: \$300 billion in the United States, \$500-600 billion in Japan; 650 billion French francs [Fr] here in France.

Some want to build the network of the 21st century, using only fiber optics, handling huge data rates, and mobilizing colossal investments. For others, information superhighways begin with the high-speed Minitel [French videotex terminal] and microcomputers equipped with modems that will enable people to access databases via the traditional telephone or the Numeris network. This evokes a county road rather than a superhighway. Besides, according to Charles Rozmaryn, the France Telecom general director, the terminology is faulty: what we call superhighways are merely access ramps to the public network composed of high-data-rate main roads which are in fact the true superhighways.

As if things were not already complex enough, cable operators (who operate cable-TV networks) chime in, talking about pay-per-view games and interactive video-type programs and home shopping. From data processing, we go on to radio and television. Thus, we each make this fashionable term mean what we want it to mean. In France, the stakes will be more clearly defined in July, when Gerard Thery submits his report on information superhighways as the French see them. For Thery, this is a revolution as important as the railroads or electricity. We already know the approximate cost (Fr150 billion for infrastructures, and Fr450 billion for software) and some of the themes covered: contents and markets, regulations (should new uses entail making new rules?), the players, the standards, and the impact on employment. [passage omitted]

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### The Players Are Mobilizing

It was the echo of these battles that crossed the Atlantic earlier this year. "In France, the debate was immediately taken over by politicians," said Georges Nahon [consultant and honorary president of AFTEL (French Information Systems Association)]. "It fell among the Canal+ furor, the failure of high-definition television, and the stagnation of the Cable Plan. In France, the information-superhighway project has more or less become that of the television of the future." Since then, the fever has somewhat subsided and, officially, the parties involved are waiting for the Thery report before announcing their battle plans. Moreover, the European Commission is about to declare its position, especially after the publication of the Bangemann report. That report, very much geared to deregulation, reflects the manufacturers' point of view. But deregulation is just a means, not an end in itself. There remains to define a policy. The recent summit of the heads of states in Corfu, at any rate, confirmed that information superhighways are a priority. This being said, although many aspects still remain unclear and although major decisions have not been made yet, the players (operators, manufacturers, service companies) are mobilizing. Especially at France Telecom. "We have two approaches," explained Michel Treheux, in charge of the evaluation and futurology department of the Directorate of Plan and Strategy. "One starting with radio and television, the other with computer databases." In the first case, consumers are the main targets, through cable networks offering services like pay-per-view television and home shopping. Investments are considerable, experiments are required, and users' response is rather slow (from five to 10 years, according to France Telecom estimates). "Interactive television tests mobilize only 3 to 4 percent of all households," Michel Treheux estimated. In the second case, the market is far more responsive, and we can have professional or consumer applications. "This is where the true stakes lie," Michel Treheux pointed out. "Who will offer databases? Who will publish software packages? In this sector, the French industry is producing haute-couture rather than ready-to-wear. But the latter is now the fast growing market sector." In a first stage, the French operator is considering mostly new types of information services, in particular thanks to the high-speed Minitel (4,800 and 9,600 bauds). France Telecom also announced the creation of a general public videotex service via PCs. "The 9.6-Kbps modem remains the basic component," according to Michel Treheux. "With higher data rates, we can go on to Numeris. Our strategy is to multiply network uses and make the most of what is already there." Obviously, the operator wants to carefully avoid the mistakes of the Cable Plan and the Biarritz experiment: offering a wideband network without making any actual provision for services. To think about services, that is precisely the job of Gerard Eymery, the France Telecom Multimedia CEO [chief executive officer]. The goal is to explore multimedia markets in partnership with others, and to promote initiative. The principle is to make use of what already exists. "We think in terms of services, markets," Gerard Eymery explained. "We are less concerned about the technological aspect, in particular terminals. France Telecom forms partnerships to get involved in services, while remaining a minority

partner." This again, is a two-level approach. The first level is geared to cable and satellites, coupling interactivity and multimedia. It can be, for instance, a pay-per-use service. The second level involves the Minitel. But installed-base problems are soon encountered. Even with higher data rates, the Minitel will remain a terminal with limited performance characteristics. With a PC, catalogs or programs can be downloaded and then viewed locally. To use some services, therefore, a microcomputer will be necessary. "We considered some 50 projects, and we are working on about 15." A few projects were already started, like the French-museums project or the pay-per-view project. This approach is very similar to the approach used in the late eighties to launch the Numeris network. As for network infrastructures, the operator is preparing them through massive investments in fiber optics: 2 million kilometers will be installed by the year 2,000, with 2.5-Gbps data rates (30,000 telephone lines) on some sections, or even 10 Gbps. An investment of over Fr20 billion per year. That is for the general network. But fiber optics will also reach into companies through ROFs (flexible fiber optic networks) and even all the way to "users' doors." There are four test sites: Serris (Seine-et-Marne), Epagny (Haute-Savoie), Arcachon, and Bastia.

### A New Deal

As for French cable operators, they do not necessarily all use the same strategies. "Information superhighways are a nice concept, but our number-one priority is to put the telephone on cable," we were told by Philippe Santini, CEO of the General Videocommunication Company, a subsidiary of the General Water Company. Lyonnaise Communication (a subsidiary of the Lyon Water Company), another cable operator, intends to enter this new market. "We observe a certain convergence of technical and economic pressure," Cyrille du Peloux, CEO of Lyonnaise Communication, explained. "Added to the trend toward deregulation, this leads to a new deal among the players. The barriers between activities pertaining to the containers and those pertaining to the contents are no longer as impenetrable." Things, therefore, might well change rapidly. "Within one or two years, we might enter the era of video information services, i.e. add images to present information services," Cyrille du Peloux went on. "France is lucky in that it has a leading-edge information-services industry; we must make the most of this advantage." There remains the fact that cable networks were initially designed to distribute video programs; turning them into information superhighways will require considerable technical upgrading.

### Software: the French Can Do Better

Equipment manufacturers, too, are busy getting ready. Alcatel, the world telecommunications leader, is preparing for battle, deploying its whole range of technologies—in particular fiber optics and ATM [asynchronous transfer mode]—and placing its markers. For instance, it was chosen by BT [British Telecom] to supply servers, decoders and the "telecommunication chain" in a U.K. pay-per-view video experiment.

In the United States, in a partnership with Pac Bell, Alcatel takes part in the cinema-of-the-future project: to distribute films to movie theaters in ATM digital form instead of on

film reels. The manufacturer is also expanding its range of activities. Through its General Occidental subsidiary, it keeps acquiring stakes in cable and electronic-publishing companies, among others. In Switzerland, it just took over Cortailod, a cable manufacturer. With it, it got Rediffusion, a cabled channel serving close to 700,000 subscribers. "Television will change a lot," Dominique de Boisseson, vice-president of Alcatel's Network Systems Group, noted. "To better understand the market and the new needs, we must become players ourselves." For its part, IBM just created a specialized subsidiary, named Networked Application Services, which employs about 100 people: a specialized body of troops, the main mission of whom will be to provide solutions to both professionals and individuals. Hewlett-Packard is also lining up, gathering its troops under one banner: HP = MC2 (Measurement, Computer, and Communication). Its three branches pool their efforts to develop tomorrow's information-service and multimedia servers, video printers, and data-transmission networks. Pacific Telesis has chosen it to perform an experiment.

While a mobilization takes place where infrastructures and services are concerned, there is much less talk about software. Yet, all agree that this is a key factor in a battle that must not be lost. Gerard Thery pointed that out.

Some nevertheless remain optimistic. "We are quite capable of developing software that will change present information services, based solely on text, into more user-friendly services based on graphics and fixed images," Georges Nahon estimated. "As far as future wideband multimedia services are concerned, it is true that both servers and operating systems are American, because things have already started over there. We would need a few experiments to start the French industry."

[Box by E.D. and Jean-Pierre Soules, page 15]

#### **"Europe: Everything That It Needs To Succeed"**

At the recent Corfu summit, the heads of state approved proposals for a European information superhighway program. Governments will intervene essentially to achieve standardization. But no material decision will be made before the Essen summit in December. The report on "Europe and the Global Information" written by Martin Bangemann (with a group of large manufacturers) was actually found too vague. It proposed three themes of action: material networks, basic services such as electronic messaging, and finally 10 fields of application. It is on the latter that the Community must work and better define its objectives if it is to get the green light from the heads of state at the end of the year. It must also focus more on the data transferred than on the transfer means proper. The only material action decided in Corfu involved the appointment of one ministry official per country, to be in charge of the information society. This reflection on the European vision for the information system was kicked off by the publication of Jacques Delors' white book, at the beginning of the year. Large infrastructure networks (roads, very-high-speed train, communications) were among the themes considered. This being said, the strategy to follow to build these superhighways has not been fully defined yet. Regulation questions remain a major subject

of debate. Whereas Brussels pleaded for a progressive deregulation of the communications sector, Martin Bangemann's report somehow caused an uproar by advocating rapid deregulation. As for financing, funds will come, as in the United States, from "market forces." No wonder then that the industry is impatient to see the operators' monopoly, especially on infrastructures, open up so as to enable them to gain a foothold in this new market. In the power struggle that is starting between Europe and America, the United States are a few lengths in the lead. But "Europe has everything that it needs to succeed in meeting the challenge of information superhighways," according to Yves Domzalski of DG-13 [General Directorate]. "We should not go by the determined tone of American officials. This is a matter of cultural difference rather than a matter of means."

[Box, page 17]

#### **The Expert's Opinion**

We should not be trapped into preparing the future while neglecting the present. To deploy a vast fiber-optics network reaching into households is no doubt necessary, but it will take 10 or 15 years. We cannot remain inactive that long. With the Minitel, however, France has a unique experience of the consumer electronic-information market. We can improve what is already there and, for instance, develop new, more graphic and more user-friendly services accessible from a PC equipped with a modem and using the telephone or the Numeris network. Why not design a plan like the "Balladur Fr5,000" to promote the purchase of microcomputers that will be tomorrow's communication tools? Another way would be to use the infrastructures of the Cable Plan. Let's not forget that France counts some 5 million network connections. Obviously, we would have to digitize them, to develop their interactivity. We could thus experiment to prepare tomorrow's services.

#### **EU: R&D Ministers Favor Rapid Information Superhighway Development**

94WS0477B Paris AFP SCIENCES in French  
21 Jul 94 p 12

[Article: "European Research Ministers Favor 'Electronic Superhighways'"]

[Text] Schwerin—On 18 July, during an informal meeting in Schwerin (near Hamburg), European Union research ministers declared themselves in favor of the swift establishment of high-speed, interconnected data-transmission networks to stimulate research. The Swedish, Finnish, Norwegian, and Austrian ministers, whose countries are expected to enter the European Union on 1 January 1995, also took part in the meeting.

The European Union's various national networks, also referred to as "electronic superhighways," are to be interconnected and the data-transmission speed "considerably increased," German Minister of Research Paul Krueger declared. The establishment of such a network, the cost of which has not yet been determined, could serve as a testing ground for new applications that may be developed and which constitute a future market.



Furthermore, the 16 ministers insisted on the need for close collaboration in the field of aeronautics to render coordination between national and European research projects more effective. According to Mr. Krueger, this essentially involves Germany, Italy, Great Britain, Sweden, Spain, the Netherlands, and France.

### **Review of EU Programs for S&T Cooperation With Eastern Europe**

94WS0474A Luxembourg EURO ABSTRACTS  
in English Jul 94 pp 438-443

[Article entitled: "Scientific and Technological Cooperation With Central and Eastern European Countries"]

[Text] In September 1991, the Committee on Energy, Research and Technology (CERT) of the European Parliament presented a report on scientific and technological cooperation between the European Union and other European countries. On the basis [of] this report, the Commission implemented an action programme, named COPERNICUS, in 1992, which through the development of cooperative research activities between East and West aimed to contribute to the democratisation process taking place in the former Communist block. In this paper, a representative of STOA outlines the guidelines set out by the European Parliament, and the subsequent action programme implemented by the European Commission.

The situation in Central and Eastern Europe, with regards to their scientific and technology capacity, is best described as sound scientific talent which has been undervalued and underused both for training the workforce and for supplying the technological needs of industry. By promoting cooperation between centres of excellence in the European Union and scientists from Central and Eastern European countries, benefit may be derived by both sides. The European Union will gain access to a fresh pool of scientific thought, particularly in fundamental research in classic areas, and the Central and Eastern European countries will gain knowledge of how to use that resource for improving their economic growth.

The European Parliament therefore proposed that scientific and technological cooperative activities be concentrated within the following action programmes.

**European Assistance for Science and Technology** for which the objectives would be:

- to assist and accelerate the changes in research structures, and to consolidate scientific and technological potential through additional training and mobility of researchers, and the creation of networks between universities, laboratories and research centres between the East and West;
- to improve the status of researchers, thereby reducing "brain drain" to the Western countries, and to increase the number of women active in science and technology;
- to foster cooperation between businesses in East and West and approve common industrial standards.

**General Research in Environment for Eastern Nations** which would aim to enable Central and Eastern European

countries to acquire the scientific and technical know-how necessary to tackle environmental problems caused by energy production or industrial production processes. Five main action lines were proposed:

- The development of environmental technology for cleaner production processes, and the development of a common set of rules for Environmental Impact Assessment;
- the development and introduction of consistent and generally applicable environmental standards;
- the development of facilities for the supervision and management of air, soil and water, e.g., satellite monitoring or air pollution detectors;
- the development of instruments for environmental management specific to the Eastern Europe situation, by businesses and governments;

the implementation of a joint programme focusing on energy yield in industrial production cycles and in agriculture.

### **COPERNICUS: Scientific and Technological Cooperation between the European Union and Central and Eastern Europe**

On the initiative of the European Parliament, the European Council adopted the COPERNICUS programme in 1992, otherwise known as the PECO or IPECO programme. Whilst the practical implementation of the programme differed slightly from the recommendations of the European Parliament, many of the guidelines and objectives were adopted successfully.

The overall objective of preparatory cooperation activities within the scheme was to explore ways of contributing to the rehabilitation of industry, and to the improvement of quality of life in the societies concerned. Three budget lines were foreseen to allow for the following preparatory and pilot actions:

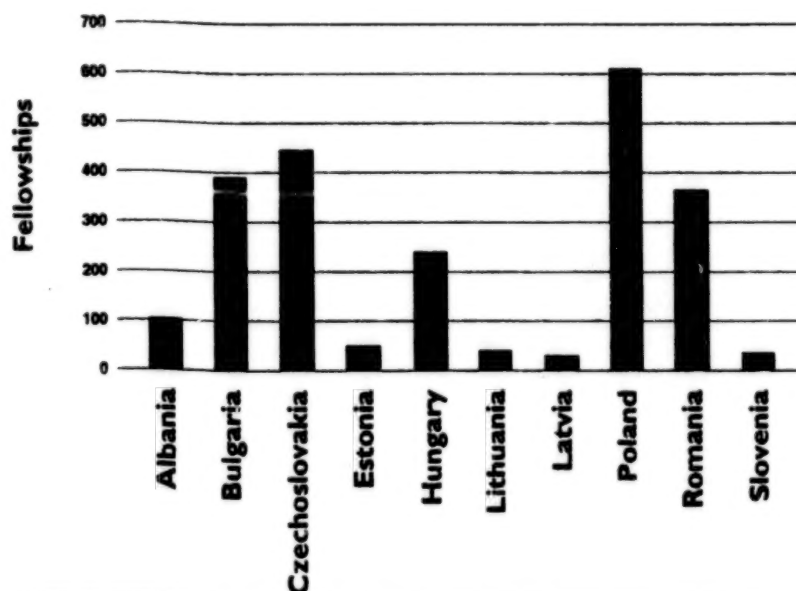
- support for exploratory cooperation projects in the field of science and technology between the European Union and countries of Central and Eastern Europe;
- support for organisations from Central and Eastern Europe wishing to participate in specific Third Framework RTD [Research and Technological Development] Programmes on a project-by-project basis;
- support for organisations from Central and Eastern Europe wishing to participate in selected COST actions.

Within this framework, the European Commission invited proposals and expressions of interest within the following six action lines:

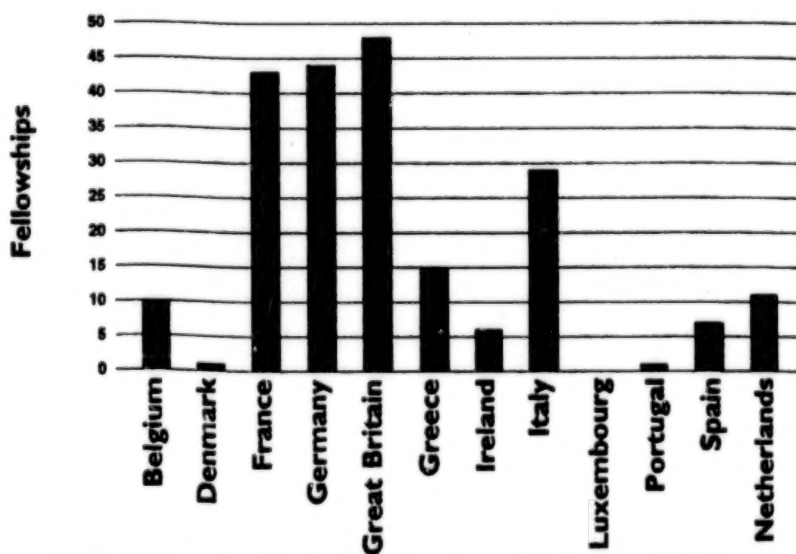
#### **1. Training and Mobility of Scientists**

This action consisted of two parts: "Go West" covering fellowships for junior and senior scientists and researchers from Central and Eastern countries in the West; and "Go East" which enabled senior scientists and researchers from the European Union to visit establishments in Central and Eastern Europe. The research areas included all exact and natural sciences, economic and management sciences as well as human and social sciences. Fellowships for 1992 are shown in Figures 1 and 2.

**FIGURE 1: NUMBER OF FELLOWSHIPS 'GO WEST' PER COUNTRY FUNDED IN 1992**



**FIGURE 2: NUMBER OF FELLOWSHIPS 'GO EAST' PER COUNTRY FUNDED IN 1992**



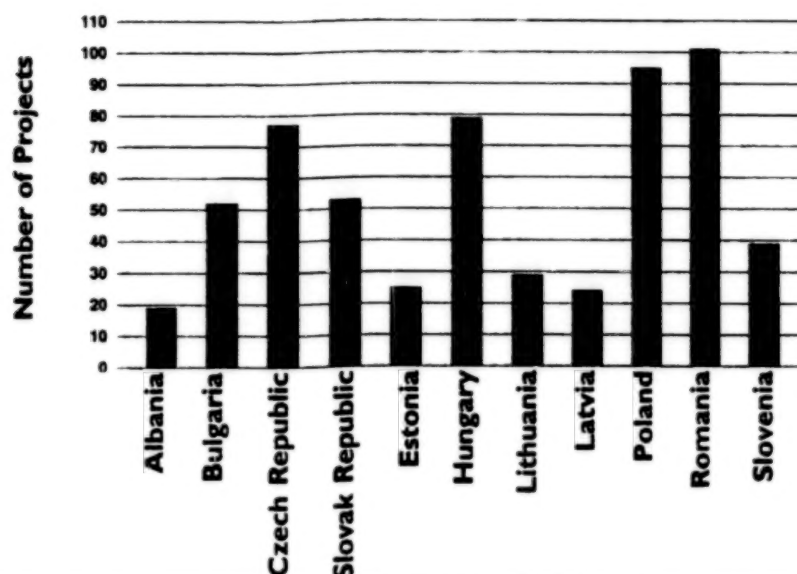
## 2. Development of Pan-European Scientific Networks

Financial support is given to the promotion of contacts between member scientists, access to laboratories and scientific equipment, and the circulation of, and access to, scientific and technological information. It also covers administrative and

technical infrastructure, including secretarial tasks, communication networks and databases. Participants include universities and equivalent institutions, private and public research organisations and enterprises in Central and Eastern European countries and in the European Union.

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**FIGURE 3: NUMBER OF PROJECTS FUNDED UNDER COPERNICUS IN 1993**



### 3. Conferences, Workshops and Seminars

The Commission supports the organisation of events which aim at promoting contacts between East and West, encouraging scientific and technological cooperation, and facilitating the training of scientists and research managers. Participants include groups within universities, public or private research organisations, or enterprises in Central and Eastern Europe and in the European Union. In exceptional cases individuals are eligible for support for attendance at conferences, workshops or seminars.

### 4. Joint Research Projects

Joint Research Projects focus on the transfer and development of knowledge and technologies likely to contribute to the rehabilitation of the economies of Central and Eastern European countries. Projects cover research in the areas of quality of life (environmental protection, health protection, social sciences and social problems) and industrial technologies (information and communication technologies, materials and production, agro and food industries). Participants may be universities, public or private research institutes, and firms, including SMEs [small and medium-sized enterprises], in countries of the European Union and of Central and Eastern Europe. The research projects must contain at least one Central and Eastern European partner and one from the EU, with preference given to groups of several partners balanced between East and West.

### 5. Participation in EC RTD programmes

The Commission provides support for the participation of organisations and enterprises of Central and Eastern European countries in projects of existing and approved Community programmes for RTD which allow participation on

a project-by-project basis. In the Third Framework Programme five areas, "Environment," "Biomedical and Health Research," "Non-Nuclear Energy," "Nuclear Fission Safety" and "Human Capital and Mobility," were open to participants from Central and Eastern Europe.

### 6. Participation in COST actions

The Commission provides support for the participation of organisations and enterprises of Central and Eastern Europe in COST. Proposals are selected after consultation with the COST Committee. The COST actions specified already have significant established involvement on the part of organisations in the Member States.

### Implementation of the COPERNICUS programme

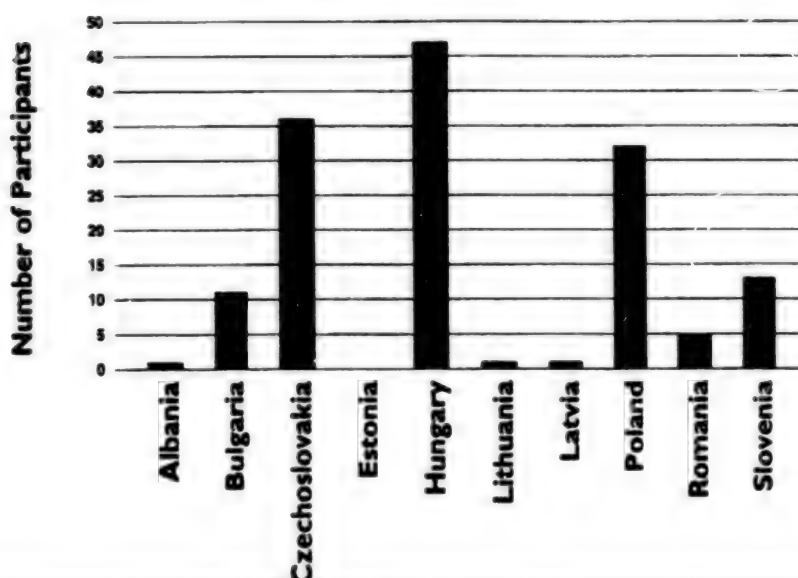
The 1992 budget provided a total of 55 MECU to support RTD cooperation projects with Central and Eastern European countries:

- 40 MECU to support projects pertaining to scholarships, seminars, networks, workshops, conferences and joint projects;
- 10 MECU for participation in 5 specific programmes of the EC Framework Programme (Environment, Nuclear Fission Safety, Non-nuclear Energies, Bio-Medicine and Health, Human Capital and Mobility);
- 5 MECU for participation in COST actions.

A total of 3,364 projects were approved by the evaluation committees, and more than 3,000 projects were financed with the following breakdown: 2,531 fellowships (see figures 1 and 2), 43 networks, 159 conferences, 30 Joint



FIGURE 4: NUMBER OF PARTICIPANTS IN THE COST PROGRAMME



Research Projects, 129 specific RTD projects (figure 3), 147 COST actions (figure 4).

A number of additional projects were approved but could not be supported due to a lack of financial means. Hence, the Commission decided not to launch a similar initiative in 1993 but to use part of the 45 MECU committed in the 1993 budget, plus 25 MECU transferred from the reserve, to support the projects which were selected but not financed under the previous budget. A further 230 projects, therefore, received financial support.

A second more restricted call for proposals was opened in 1993, with a budget allocation of 17 MECU, directed at the participation of Central and Eastern European countries in on-going projects within the five currently open specific EC programmes. Over 650 applications were received and, after evaluation, 261 projects were chosen for financial support.

In 1994, a third Call for Proposals within the scheme for Cooperation in Science and Technology with Central and Eastern European countries was issued in January. Priority has been given to Joint Research Projects of direct concern to countries of both Central and Eastern Europe and member states, and to "Concerned Actions" which clearly demonstrate mutual benefit and which are likely to contribute to the establishment of fruitful and longer-term cooperations. A budget of 57 MECU has been made available to finance these projects over 1994.

Project proposals focus on areas of the RTD Framework Programme not covered by the five open specific programmes in which projects are on-going. The targeted research sectors therefore include:

**Industrial Technologies:** Information Technology, Communication Technologies, Telematics and Language Engineering, Manufacturing, Production, Processing and Materials, and Measurements and Testing.

**Life Sciences:** Agro- and Food Industries, Biotechnology.

A further call for proposals for participation in the on-going projects within the five research programmes of the Third Framework Programme was also launched in early 1994 and a budget of 29.5 MECU made available for this purpose (approximately 3 times that available in 1992).

#### Future Cooperation With Central and Eastern Europe

Future actions in Cooperation RTD activities with Central and Eastern Europe will be based on experiences gained from these pilot projects. In particular, greater emphasis will be placed on participation by industry, especially SMEs, in order to maximise the contribution to the rehabilitation of industry. An evaluation of the pilot projects concluded that there was a lack of interest on the part of Western industries, partly due to the insufficient legislation on property rights in Eastern countries. It has therefore been proposed that in the networks and Joint Research Projects it will be required that one partner is from industry.

Under the Fourth Framework Programme (1994-1998), a new area of activity has been established to take account of RTD cooperation with third countries and international organisation. Within this area, the Commission will continue to fund activities involving countries of Central and Eastern Europe through the involvement of these countries in the specific technical programmes of the Framework Programme, other specific actions such as those required

to deal with environmental problems, and actions implemented through the International Association for cooperation with scientists of the former Soviet Union (INTAS).

The action programme will widen and deepen cooperation between the EU and Central and Eastern Europe, complementing the activities of individual Member States and other Community initiatives in this field such as TACIS and PHARE.

#### **Germany: JESSI Applications Subprogram Reviewed**

*BR1908073594 Berlin MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK in German  
May-Jun 94 pp 166-168*

[Article by Dr. Anton Sauer, chairman of the JESSI Applications Subprogram Management Board: "The JESSI Applications Subprogram Promotes Innovative Key Products"; first paragraph is MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK introduction]

[Text] The work performed under the JESSI [Joint European Submicron Silicon Initiative] Applications subprogram shows the application-oriented nature of the JESSI European microelectronics program. The intensive dialogue between system houses and semiconductor users has already confirmed the importance of vertical cooperation in achieving JESSI's goals. The results obtained to date by the CAD [Computer-Assisted Design] projects are being used in the Europrojects, and prototype Europroject developments have been presented to the public on various occasions, trade fairs included. The small and medium-sized enterprise project, for example, is already running smoothly, despite the many problems that joint international work entails. The network of support and service centers is also fully in place.

#### **The Basic Idea Underlying the Applications Subprogram**

The JESSI Board and the JESSI Subprogram Management Boards are the executive bodies in the JESSI organization. Their brief is to stimulate, organize, and coordinate the research and development required to implement the JESSI program. The four subprograms reflect the various areas to which JESSI is committed. Wherever possible, joint projects are designed to exploit synergies.

The JESSI Applications subprogram promotes the development of innovative, complex microelectronic key products with a strong commercial bias. These projects (Europrojects) were selected firstly in view of their economic significance for key sectors of the electronics market, and secondly in the light of the availability of the requisite technology and CAD environments. They will provide prototypes and demonstration models. The chip sets [Saetze] may be regarded as the core of complete integrated systems. As JESSI-developed technologies are used intensively in these projects, they also serve as a test bench for the technologies themselves.

Design tools were needed to create these complex, highly integrated circuits in order to meet demands such as time to market and a reasonable cost-price ratio. The development of future CAD tools to meet the requirements of both the Europrojects and the market thus formed another

section of the JESSI Applications subprogram. Initially, the Europrojects will use currently available technologies and CAD tools, but JESSI's results in this area will subsequently acquire increasing importance.

#### **Principles Underlying JESSI Flagships**

Close, primarily vertical, collaboration between the various projects is essential in such an extensive program as JESSI. In order to foster this vertical integration, clusters were formed within the Applications subprogram, each cluster combining a CAD project with a Europroject, the Europroject being known as the flagship. The technical link between the projects takes the form of the flagship project setting fundamental functional requirements to be met by the CAD project, the objective being to give the development of CAD tools within JESSI a more marked user orientation.

Of course, a CAD project does not merely meet its flagship's requirements; it also benefits other JESSI and non-JESSI projects. Additional Europrojects can also be tied in with the flagship project to form flagship clusters. Close contact must also be maintained between the JESSI Applications and Technology subprograms so that the Europrojects can apply JESSI technologies. Each Europroject is therefore linked with the CMOS [Complementary Metal-Oxide Semiconductor] Logic technology cluster, the Europroject's requirements in terms of technology being itemized and coordinated with the Technology cluster.

#### **Areas of Application**

The Applications subprogram comprises six flagship clusters in various market segments, complemented by five individual projects. The market segments concerned are:

- automobile electronics;
- computer electronics;
- consumer electronics;
- telecommunications, and
- information display systems.

The first four are represented with one or two flagship clusters and the fifth by the individual project on digital controls for high-definition screens.

These market segments constitute a broad range of activity for JESSI technology and CAD tools and affect major areas of the European electronics industry. Of course, other areas could be covered as well if interesting proposals falling within the terms of reference of the JESSI program were submitted.

#### **Automobile Safety Electronics**

The European industry still holds a strong position in automobile electronics. Four European firms, including the European market leader, are to be found among the world's top 10. The strategic goal must be to safeguard this position, and JESSI takes account of this in its project entitled: "Very Large-Scale Integration Control Unit for Safety-Critical Systems," which sets out to create the hardware for implementing integrated control units on a single chip. The latest technology is used for this "system on silicon." The "Synthesis, Optimization, and Analysis" CAD project also comes under this flagship, its main goal

being to provide synthesis at the highest level. The CAD project's principal significance for the cluster lies in its development of tools that radically reduce design time and make for high-quality designs.

#### Computer Electronics

European computer manufacturers continue to occupy a major position in, primarily, the European computer market. The "Advanced IC's [Integrated Circuits] for High-Performance Computers" flagship project focuses on the development of components for use in multiprocessor systems and high-speed interconnections for mass memory subsystems. High growth rates are anticipated for both these segments of the computer market, and they require the most highly advanced functions of submicrometer technology available. JESSI also takes account of the growing interest in the multimedia market. The project on "Integration of CD-I (Compact Disk Interactive) Into PC [personal computer] Environments" combines the CD-I architecture, one of the leading multimedia architectures, with the PC.

The "CAD Tools for a DSP-ASIC [Digital Signal Processor Application-Specific Integrated Circuit] Design Method" CAD project completes the Computer cluster. This project is developing tools for the design of digital signal processors as part of a complete commercial DSP design system using top-down design methods and having a standard design environment.

#### Digital Audio Broadcasting (DAB)

Although the world consumer electronics market is currently dominated by Japan, some major European firms are still putting up a good showing. Great efforts are needed to maintain this position, first and foremost among them being the introduction of new European transmission standards (for receiving sets, recorders, etc.) and their implementation in advanced CMOS technology. JESSI is fostering this strategic goal in the audio field via its flagship project on "Development of Prototype Components for a DAB Standard," which sets out to develop an IC set for a DAB receiver and to test the viability of a system fitted with the IC's concerned. It is also working closely with EUREKA [European Research Coordination Agency] Project EU 147, which is engaged on common European transmission standards and their system integration.

Its link to CAD work is provided by the project on "Development of an EMC [electromagnetic compatibility] Workbench for Microelectronics Applications." In order to reduce development times for electronic components and systems and to dispense with expensive interference suppression systems, this project will create tools that will enhance the electromagnetic compatibility of appliances. These software tools, which are integrated into a design environment known as the EMC Workbench, can also be used to solve similar problems in other applications.

#### High-Definition Television (HDTV)

HDTV must be regarded as the major new consumer electronics market segment of the late nineties. Digital broadcasting standards and the 16:9 HDTV screen format accepted worldwide clearly indicate that Europe must move in the direction of a new species of "home cinema." The JESSI HDTV cluster's flagship project on "Digital

Television Receivers (DTVR's)," which is developing the key components for these television sets, covers the receiving end of the system.

In view of the complexity of the system and the specific demands that its functions have to meet, appropriate CAD tools are of prime importance, test aspects having high priority. The JESSI CAD project on "Development of Tests and Testable Components" is thus working closely with the DTVR project, its brief being to develop automatic writing tools for test programs, and also to work on tools to enhance the testability of electronic devices during the design phase. Tools of this type can be used, for instance, to implement self-test functions. The projects on "Digital Video Recorders (VCR's [video cassette recorders])" and "Improved Television Receiver Quality," which sets out to bridge the gap between present-day and future television technology, complete the cluster.

#### Mobile Radio Telephone Service

Europe is the world leader in telecommunications, with a market share in excess of 30 percent. In order to maintain their leading position, European manufacturers must enlarge their share of the international market and ensure supplies of the requisite chips with a high level of integration. JESSI is fostering this goal with a number of major projects, two of which promote the development of next-generation mobile radio telephone sets under the European GSM [Global System for Mobile Communications] standard. The "Modern VLSI [Very Large-Scale Integration] Devices for GSM" flagship project has been launched to work on the digital signal section of the baseband for a system of this type, and it is flanked by the "Automatically Controlled Mobile Radio Telephone Service" Europroject, which is developing the circuits required in GSM systems for the HF [high-frequency] front-end. The GSM standard also provides exceptional facilities for transmitting digital-coded information on road traffic. The "Traffic Information System via Mobile Radio" project promotes the implementation of this idea by developing the requisite on-board devices for receiving and decoding the data.

Another of these projects is the "Expert Systems for Analog Design" CAD project, which promotes the design of analog and hybrid analog-digital circuits and systems. Analog design automation is years behind that of digital design. A successful conclusion to this CAD project will give Europe a unique design system and substantially influence development in the relevant JESSI Europrojects.

#### Broadband Communications

The integration of all the services currently provided by a variety of different networks into a single ATM (asynchronous transfer mode) broadband network will radically enhance network application potential and facilities in the nineties. One of the application-oriented JESSI projects, "Modern VLSI Devices for Broadband ATM ISDN [Integrated Services Digital Network] Networks," focuses on key components for future systems of this type. The research and development work undertaken on this project mainly concerns components for switching and transportation functions in ATM networks. The project on "Euro-CAD for Board Design" provides system houses with design tools for integrating complex VLSI devices on high-performance assemblies. This will further increase the influence of JESSI VLSI projects on future system developments.



### Individual Applications

Some individual projects have not been incorporated into flagship clusters, but they nonetheless play a major role in the Applications subprogram. One of these is the "JESSI Common Frame" project, which sets out to create software for open integrated CAx environments.

The "Libraries for HDL (hardware design language) Components" project supports the definition of JESSI standards and makes it possible to transfer technology-independent cell libraries for various areas of application to and from semiconductor manufacturers and users.

The "Technology Assessment" project was launched to standardize the interface between technology suppliers and users. A standard for test chip design and the requisite test and assessment methods used in evaluating a new technology will improve cooperation between technology suppliers and users.

The Europroject on "Digital Controls for High-Definition Screens" covers the growing market in multimedia terminals and workstations, developing a set of IC's as key components for high-definition screens.

### SME Project

The strength of European industry is largely founded on its small and medium-sized enterprises, and the project on "Support for Small and Medium-Sized Enterprises (SME's)" was introduced to promote the use of microelectronics in these businesses as well. It will enhance, and where necessary, impart know-how via technology and CAD transfer, training, and demonstrations. Several hundred of these promotional events have already taken place in the service and support centers participating in this project throughout Europe.

### Germany: JESSI Equipment and Materials Subprogram Reviewed

BR1908072894 Berlin MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK in German  
May-Jun 94 pp 164-165

[Article by Erik J.R. Kamerbeek, chairman of the JESSI Equipment and Materials Subprogram: "The JESSI Semiconductor Manufacturing Equipment and Materials Subprogram"; first paragraph is MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK introduction]

[Text] The JESSI Equipment and Materials Subprogram is directed by its own management board, whose members come from Germany, Great Britain, France, and the Netherlands. The board, together with a panel of experts from the semiconductor industry and the research institutes, is responsible for orienting, coordinating, and overseeing the projects.

### Support for Equipment and Materials

It was clear from the very beginnings of JESSI [Joint European Submicron Silicon Initiative] that a strong, more autonomous semiconductor industry could only be created under particular conditions, one of which is the existence of a strong, healthy manufacturing equipment and materials (E&M) industry. It was therefore decided to devote

part of the work performed under JESSI to the development of this sector. A considerable portion of the budget was used to strengthen weak European E&M firms and to provide further support for those that were already flourishing. In retrospect, the JESSI E&M subprogram has proved highly successful in the past and will continue to be so in JESSI's remaining years.

A management board was appointed to steer this subprogram, which comprises a large number of projects and involves an even greater number of firms and institutes. The members with voting rights are representatives from the German, Dutch, French, and British industries. The board, assisted by representatives of semiconductor firms and relevant institutes, lays down the premises for the E&M program. After examining submissions in detail, it proposes projects that it deems worthy of the "JESSI label" and monitors their progress. It also handles a number of other important matters, such as interaction between the Technology and E&M subprograms.

### New Projects for Old

There are currently E&M subprogram projects at all stages of completion. Some of the early projects have already been successfully concluded or are in their last scheduled stages. Commercial successes were already scored in 1993, and an increasing number of marketable results is emerging. Some projects have reached the half-way stage and will produce their first marketable results early in 1995. Last but not least, there are some projects that did not begin until 1993 or 1994 and are consequently still in their initial stages.

All this shows that JESSI is alive and well. To date, we have launched new projects every year. This is particularly important now, when some projects have already been completed, freeing money for new work.

The JESSI E&M subprogram addresses six main sectors. As far as manufacturing equipment is concerned, these are optical lithography, deposition and etching processes and the associated techniques, integrated circuit testing, and automation and clean-room engineering.

Materials projects are being carried out on high-purity gases and chemicals, covering their production, analysis equipment, the silicon substrate material used, and the sputter materials.

The individual projects are grouped together in clusters to promote the exchange of information and results—to the advantage of all the participants. The clusters meet at least twice a year, and direct results obtained in the joint projects are exchanged initially at these meetings. This also makes it possible to merge smaller projects into larger, integrated projects.

### Individual E&M Projects

Of all JESSI programs, the E&M subprogram presents the largest number of individual projects, although most of them are much more limited in scope than the projects carried out under the other three main JESSI programs: Technology, Application, and Basic and Long-Term Research. The number of man-years invested annually by each participant is also much lower on average. This

derives from the fact that most E&M firms are also much smaller. JESSI thus mainly supports small and medium-sized enterprises with its E&M work. This has sadly meant that some projects have had to be discontinued in recent years for reasons beyond the control of JESSI. For instance, some firms have gone bankrupt, whereas others have withdrawn from the semiconductor business.

#### Criteria for Projects

The main selection criteria for adopting a project out of over 200 proposals have been the technical relevance of the project to the JESSI community, the likelihood of its bringing technical solutions and rendering them marketable, and user industry participation. All these criteria remain valid today, although the emphasis has shifted to satisfying market demand.

#### International Cooperation

In addition to promoting cooperation on a purely European scale, JESSI has also established contact with Sematech, a fact that primarily involves the E&M program and its participants. European E&M firms were able early on to show their metal to Sematech, which represents more than 10 of the major American E&M users. This means easier access to the American market for European suppliers, added to which Sematech is most welcome as an additional user for JESSI E&M developments.

JESSI has built up a strong, well-organized relationship with the various governments involved. In view of the large number of small E&M firms, the systematic consultations and planning sessions with the various governments should considerably help build up a clear, unified E&M support program throughout the whole of Europe. Regular talks have created a positive atmosphere that is of enormous benefit to the E&M industry and will last beyond the timeframe scheduled for JESSI.

#### What Will Happen After 1996?

Work is currently under way on defining the strategy for the E&M industry for the years following 1996, the last year of the JESSI program. There is no doubt that this sort of activity must continue over the coming decades. The development of 0.18-micrometer structure gigabit chips will ensure that the E&M industry has a major role to play in the future as well.

One of JESSI's priority goals is to enhance manufacturing technology and strengthen the industry, rendering it independent of non-European resources and, consequently, less vulnerable. Direct support for E&M firms thus benefits not only R&D, but day-to-day business as well.

Low investment levels in the semiconductor industry over recent years have made the domestic market decidedly unprofitable for European E&M firms. Announcements of plans for a number of major new plants, such as those planned by Philips in Nijmegen, SGS-Thomson in Crolles, and Siemens in Dresden, should mean that European semiconductor manufacturing equipment suppliers will see an upward trend in the future.

#### Germany: JESSI Manufacturing Subprogram Reviewed

M11808144794 Berlin MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK in German  
May-Jun 94 pp 160-162

[Article by Juergen Griessing, leader of the JESSI Manufacturing Science and Technology Subprogram: "Manufacturing Technology Development—The Foundation for a Successful IC Industry"; first paragraph is MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK introduction]

[Text] The research and development work undertaken under the Manufacturing Science and Technology sector is of crucial importance to the success of the European IC [Integrated Circuit] industry. It is universally acknowledged that forward-looking work of this type lays the foundation for success in our IC industry. The cost of introducing the latest technologies rises with every new generation of products, which is why cost-efficient manufacturing methods are just as important as presence on the market at as early a date as possible.

#### Terms of Reference and Participants in the Subprogram

The Manufacturing Science and Technology (MST) project is a JESSI [Joint European Submicron Silicon Initiative] project and is funded via the EU Commission's ESPRIT [European Strategic Program for Research and Development in Information Technologies] program. The project covers the wafer fabrication (front end), assembly and testing (back end), and mask fabrication steps in IC manufacturing. The automation and integration aspect, which is of all-round relevance, permeates all three steps. The following firms are participating in the project: ES2, GEC Plessey Semiconductors, MHS Electronic, Mietec-Alcatel, Philips, Siemens, SGS-Thomson Microelectronics, and Temic. IBM is an associate participant.

#### Project Goals

Manufacturing science and technology is the constant, gradual, and systematic improvement and enhancement of knowledge and know-how in highly developed IC fabrication processes.

The principal goal of all work on the project is to master and apply technically and economically optimized CMOS [Complementary Metal-Oxide Semiconductor] processes in line with advances in product development—and to do so before the world market for these products has peaked. The time to market for the technically and economically optimized ("process economized") process must be reduced to the point where an optimized process in itself is sufficient to achieve volume production.

All the MST subprogram's goals represent major milestones along the road to parity with non-European competitors. This is illustrated by the graph [not shown] of launches of new CMOS generations from 1980 up to the present day (with forecasts for the next few years). The four curves trace the presentation of a process and product description at the annual ISSCC, market introduction with a few million units a year, market penetration with an output of over 100 million units a year, and market peak

(worldwide). This illustration underlines the significance of the time lapse between market penetration and market peak. This is where semiconductor manufacturers make their profits (or losses)!

The European industry's strength is in manufacturing electronic systems, and this gives the project its high commercial relevance in terms of timely availability of European semiconductor devices for telecommunications, automobile electronics, special user electronics, and other branches of the electrical industry.

The path taken and the priorities set are determined by the level of manufacturing expertise achieved in the sectors concerned. It must be made clear that the project sets out neither to deliver a universally valid collection of revolutionary ideas nor to draw up an inventory of plants and production facilities that will automatically improve manufacturing. The project is working on integrating all—in principle, existing—components involved into a manageable, economically viable system.

#### The Approach Adopted by the Project

Both conventional manufacturing technologies and new, highly developed production methods set out to control production and associated conditions, whether standard components are to be mass-produced or whether application-specific devices are to be manufactured with rapid throughput times. One of the project's objectives is to shorten the time spent on development in production engineering and the associated upgrading times.

One of the aspects on which the MST project focuses is thus the faster, reliable selection of efficient production factors, which will be fostered by the rapid dissemination of research results and reciprocal engineer exchanges.

In brief, the project has adopted the following approach to manufacturing technology, which shows its practice-orientation:

- The project's deadlines and work are largely determined by the market.
- It sets out to improve existing production processes (processes, plants, technologies, regulation and control systems, and materials).
- The topics addressed by the project are pursued under actual manufacturing conditions.
- Technological developments are to be brought from the laboratory stage to the production stage.
- Standards and guidelines are to be developed jointly.

The MST project has also set new standards in cooperation, exceeding the level of collaboration that had previously represented standard practice in production-oriented bilateral development projects. This is particularly true of the way in which the IC manufacturers themselves are working together. The MST project promotes both multilateral cooperation (research, production facility suppliers, IC producers) and multinational cooperation within Europe.

The MST project has created a framework within which the economic importance of goals that have been, or are

about to be, achieved is taken into account alongside their strictly technical aspects. The cooperation emerging on this front received a considerable boost from this project.

#### Stages in the Project and Work Involved

Three stages have been defined to date in the project:

- Stage I: Definition of the field of mutual interest and commencement of work on the 0.7-micrometer CMOS process (June 1990 through December 1991);
- Stage II: Elaboration of results for the application of the 0.7-micrometer CMOS process (January 1992 through March 1994), and
- Stage III: Continuation of the previous topics from the 0.5-micrometer process point of view, greater consideration of economic and strategic aspects (April 1994 through March 1995).

Phases I and II achieved the first major project goal at the end of 1993: The prerequisites for technically and economically optimized volume production of 0.7-micrometer structure CMOS products. The main points in the joint manufacturing technology development were as follows:

- introduction of new and novel production appliances;
- achievement of process technology objectives in an industrial environment;
- elimination of particle sources;
- agreement on the introduction of the selected types of system;
- establishment of supplier training teams;
- coordinated introduction of new structural shapes for IC's;
- CIM [Computer-Integrated Manufacturing] specifications and models and their introduction;
- improved control over manufacturing brought by new statistical process control methods, and
- standardization (appliance procurement, interfaces, calibration, test samples, test reticles).

Work is currently going ahead on these topics—where necessary with a shift in emphasis—in Stage III, the goal of which is to create the manufacturing technology prerequisites for volume production of 0.5-micrometer standard CMOS products and to deliver the first logic products with this type of structure.

More than ever, the above tasks must be seen against a background of general strategic requirements, such as:

- reduction of cost of ownership for all the plants used;
- plants designed for rapid upgrading to accommodate new technologies;
- greater attention to lean production requirements (e.g., low capacity reserves), and
- account taken of new, more efficient manufacturing trends (e.g., single wafer processes, fast thermal processes, and refined measurement methods).



### Future Topics

The following future topics for microelectronics manufacturing science and technology are emerging with extreme clarity:

- Flexible IC manufacturing lines for a large number of products and processes: IC manufacturing will change with increasing speed from highly specialized production lines to multipurpose lines.
- Flexibly combinable manufacturing units (clusters) for manufacturing sections with several (different) single processing steps: Combined, coordinated manufacturing cycles can lower the cost of ownership. Improved, value-adding manufacturing will be a crucial factor in determining plant development.
- Company-wide integration of tactical and strategic planning and control processes: Between 1994 and 1996, the IC industry is expected to have completed its selection and introduction of tactical and strategic planning and steering processes, and a start must be made on developing strategic methods. Full integration at all levels is scheduled for 1998.
- Ultraclean manufacturing processes with maximum uniformity (stability): This can only be achieved by substantially increasing the use of sensor systems with closed control loops for process parameters. The attainment level, which is currently in the region of 30 percent, must be raised to close on 100 percent by the turn of the century.
- Comprehensive logistics: Full advantage can only be taken of worldwide IC manufacturing—from process development work and manufacturing technology developments in Europe to the low-cost production facilities distributed all over the world—if computerized logistic control systems capable of meeting demand are available.
- New wafer sizes: Preparatory research into new wafer sizes (diameters exceeding 200 mm), to be carried out jointly with the equipment industry, is scheduled to begin in about three years' time.
- Overall improvement in quality assurance, productivity, defect density, and plant and process configuration: Coordinated descriptive and analytical statistical process controls, plus integrated, adaptive expert systems, will be needed for plant and process modules.

The very next goal for all the firms participating in the MST project is to bring the products made possible by the development of the 0.5-micrometer process to market as fast as possible. This can only be done economically if the requisite manufacturing environment is available as soon as it is needed.

The current phase of ESPRIT funding (Project 8003) bears in mind the common requirements of IC factories under European management. The methods and measures for improving individual areas of manufacturing to which the participants attach high priority are openly exchanged. It is neither planned nor expected that there will be only one single solution to any one of the many problems, much less so that IC factories as a whole can be rendered ideal, or even that improvements will meet the needs of every

participant in the same way. Be that as it may, the knowledge acquired by the participants will be disseminated via every employee, and this will contribute to further improvements in manufacturing.

### Germany: JESSI Technology Subprogram Reviewed

MI1808143194 Berlin MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK in German  
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[Article by Peter Tischer, member of the JESSI Technology Subprogram Management Board: "JESSI Technology Subprogram—Access to the Latest Semiconductor Technology for Industry"; first paragraph is MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK introduction]

[Text] The JESSI [Joint European Submicron Silicon Initiative] Technology subprogram sets out to give the European system and electrical appliance industry access to the latest semiconductor technology and integrated circuits at competitive prices. European semiconductor manufacturers have joined forces on a horizontal basis to develop the technologies for 0.7-, 0.5-, and 0.35-micrometer structure memory and logic circuits, while integrated circuit users and partners on the manufacturing equipment and material production side have been drawn into R&D projects on a vertical basis.

### The Advantages of Working Together

A decisive factor in goal achievement in the whole JESSI program is willingness to work together and to help one another overcome the problems that have to be solved. The IC (Integrated Circuit) firms taking part in the Technology subprogram all have their main market in Europe and, consequently, all compete with one another. Nevertheless, the partners that have joined forces in the JESSI program have realized that they can achieve their own goals faster and more effectively by working together and by embarking on joint technology development. From what has been accomplished to date, it is to be expected that the JESSI Technology subprogram will achieve its goals by the end of 1996, thus laying the foundation for further fruitful cooperation between IC producers and IC users.

### General Goals

Microelectronic devices, and integrated circuits in particular, are finding their way into more and more areas of daily life. They are no longer used solely in highly specialized professional applications, such as satellites, radar, and computers systems, but also in mundane products, such as washing machines, hand-held drills, and even toys. This has only been brought about by advances in IC production technology, which have both made it possible to integrate more and more functions on a single chip and brought a drastic drop in price per function.

JESSI has taken the extreme importance of manufacturing technology into account, setting up a specific subprogram, under the heading of "Technology," to focus on its development.

The Technology subprogram sets out to secure access to the latest semiconductor technology and integrated circuits at competitive prices for the European system and electronic

appliance industry. At the beginning of the JESSI program, in 1989, JESSI Technology thus set itself the goal of developing two new generations of storage technology and two new generations of logic technology during the term of the program. However, it emerged in the course of the program that the logic technology development program would have to be speeded up and that a third logic technology generation would have to be acceptance-tested before the end of the term scheduled for JESSI.

Another major topic addressed by the Technology subprogram was based on the realization that, to maintain or improve competitiveness, it was not enough to develop a technology that could, in principle, be used to produce a device, in other words to demonstrate feasibility; methods also had to be developed that would ensure the quality and reliability of the device and, at the same time, fulfill the cost reduction requirement. Emphasis was therefore laid on these aspects from the outset.

The Technology subprogram's work is divided into two "clusters": "Competitive CMOS [Complementary Metal-Oxide Semiconductor] Manufacturing" and "Logic Technology for Europrojects and Advanced Applications." Other projects performed under the Technology subprogram are entitled:

- Mask and Reticle Technology;
- Manufacturing with Phase Shifting Masks;
- Flexible Automated Wafer Production, and
- Silicon Hybrids.

These projects form part of the "Lithography," "Wafer Handling," and "Packaging" clusters.

Overall, more than 1,000 employees are working on the Technology subprogram. Their work is being funded by the national governments of eight countries and by the EU.

#### **Competitive CMOS Manufacturing**

The Competitive CMOS Manufacturing cluster comprises the following projects:

- Advanced Technology for Volume Production;
- Special Tools and Methods for High Reliability;
- Manufacturing Science and Technology;
- Support Tools and Systems for Advanced CMOS IC Production, and
- 200-nm Manufacturing.

About 580 engineers and technicians a year are currently engaged on the projects making up this cluster, the main focus of which is on basic technology development work.

One project area covers research and development work on new individual process steps, such as lithography, etching, and film deposition, on which memories, as a product, have to date always been the first to make new demands and have therefore acted as the technology locomotive. Firms engaged in this field must, therefore, always make the greatest initial outlay in terms of technology.

All integrated circuit manufacturers must constantly enhance the reliability of their components, a demand imposed primarily by clients who use them in safety-relevant systems (e.g., antiblocking systems in automobiles). The semiconductor producer must devise and develop methods for identifying potential causes of failure at as early a stage as possible. He must develop acceleration models for the aging process in his circuit so that he can establish in a short time how his component is likely to behave over its scheduled useful life of, for example, 20 or 30 years.

Other projects are developing methods for improving integrated circuit manufacturing. For instance, in order to fabricate an integrated circuit for a central module in a cordless telephone, a silicon wafer must, in theory, be processed for about 360 hours, during which time it is subjected to about 300 processing steps. (In reality, it takes longer. As IC manufacturing is not a conveyor-belt process, the wafers often have to wait between one processing step and the next until the equipment required, for example, to apply the subsequent coating, is free. If all these steps are performed with 99-percent reliability, at the end of the process 95 percent of all the components on a wafer will have to be scrapped—a result that no IC manufacturer can do with. At least 99.9-percent reliability must therefore be demanded for each individual step in order to reduce wastage at least to 25 percent. This is an extremely wide-ranging field, in which advances have to be achieved with new methods (automation, simplification, improved monitoring, computerization, and purer materials); at the end of the day, the quality and cost of integrated circuits will depend to an extremely large extent on these advances.

#### **Logic Technology for Europrojects and Advanced Applications**

The second cluster, "Logic Technology for Europrojects and Advanced Applications," comprises the following projects:

- Joint Logic Project;
- Embedded Memories, and
- Technological Initiative in BI- [bipolar] CMOS.

The projects making up this cluster currently involve 380 engineers and technicians a year. They are developing technologies for logic circuits, to be precise, the basic process for digital logic is being developed under the Joint Logic Project and processing options for special applications under the other two projects.

Logic technology requires more metallic layers than comparable storage technology, in addition to which a larger number of terminals are needed than with a memory component, a fact that, first and foremost, makes new demands on assembly technology. Processing options are needed for applications that require particularly fast circuits, high frequencies, lower supply voltages, lower power consumption, analog enablement, or, for example, ruggedness in aggressive atmospheres.

Integrated circuit users are also involved in the projects making up this cluster. The user concerned tests the technology option developed on his development sample and gives the technology developers the relevant feedback.

In addition to this direct contact between user and technology developer, JESSI has also set up the Application-Technology Interface Group, in which representatives of the Application and Technology management boards discuss their aspirations and ideas and coordinate the approaches adopted by the two subprograms.

#### **Project Selection and Monitoring**

The orientation of the individual projects toward the JESSI program goals is guaranteed as follows: The JESSI goals were laid down in what are known as the Green Books for each of the four subprograms in 1989. Project proposals submitted by consortia are examined by the JESSI Subprogram Management Boards (JSMB's), the Technology JSMB in this instance, for technical content, objectives, and quality. The JESSI Board, the highest decision-making body, subsequently checks whether the project is in line with the strategic goals of the JESSI program.

Projects adopted by the program are regularly monitored: Shortly before the drafting of the half-yearly report, which each project has to submit in January and July each year, a review meeting is held at which each technology project leader reports to the Technology JSMB according to a preestablished questionnaire. The members of the Technology JSMB and the project officer responsible for the Technology subprogram make their suggestions, criticisms, and proposals for any changes to the project leader.

In addition to the review meeting, at which about 45 minutes are allocated to each project, each project is subjected to an annual full-day project review, at which a detailed report is submitted to a Technology JSMB delegation and the program officer. This ensures that JESSI is kept informed as to the stage reached in the projects, the successes scored, and the problems encountered, and that the relevant JESSI board can exert a guiding influence on the projects.

Some examples of the results achieved to date are cited below.

#### **Advanced Technology for Volume Production**

The JESSI-T-1 flagship project on "Advanced Technology for Volume Production" focuses on the development of the latest technology generation for each sector concerned, particularly memory products. The project sets out to provide the basic technology for devices with 0.5- and 0.35-micrometer structures. Project participants Siemens Semiconductors and SGS-Thomson are using these technologies for their leading DRAM (dynamic random access memory) and EPROM (erasable programmable read-only memory) products. As a result of their joint work, fully functioning 16-Mbit DRAM's in 0.5-micrometer technology were fabricated as early as 1990 (seven months before the original deadline), and models of a 16-Mbit EPROM in the same technology were produced on schedule. In the light of changing market requirements, the project goals have also been widened to take in the development of the technology for flash EEPROM's (electrically erasable programmable read-only memories). A broad range of applications is anticipated for this type of memory in the future. The project's goals for 1996—development of the basic technology for 0.35-micrometer structure devices—are currently expected to be achieved.

#### **Joint Logic**

The JESSI T-20 Joint Logic project builds on the fundamental process modules, such as lithography, oxide-nitride deposition and etching, implantation, and cleaning, but develops the additional processes required for logic circuits. These are primarily special cleaning processes prior to gate oxide generation, the extremely difficult etching process for the contact holes, which have very high hole depth to hole diameter ratios, the additional metallic layers required to wire the various logic blocks, and special mounting techniques, as logic circuits need more terminals than memory circuits. Seven European semiconductor manufacturers are working together on the project. Between 1990 and 1991, all seven partners in this same consortium succeeded in completing acceptance testing for their 0.7-micrometer logic processes. Wherever possible, developments were undertaken jointly or results were exchanged. As early as 1993, some of the partners were able to supply the basic 0.5-micrometer technology logic process for prototypes or test samples. All the firms participating will complete acceptance testing on this process this year.

#### **Embedded Memory**

JESSI project T-22 on "Embedded Memory" represents another technological specialization. This project sets out to complement the basic process developed under the Joint Logic project with a family of memory blocks with various functions: SRAMS (Static Random Access Memories) embedded in logic circuits are used in, for example, composite arrays, cache memories in personal computers, and signal processors. Embedded DRAM's primarily constitute a compact, economical solution for microcontroller applications in home electronics. Smart cards and identity systems already require electrically erasable, nonvolatile embedded memories with capacities up to 256 Kbit. The objectives set for these circuits in 1.0- and 0.7-micrometer technology have already been met on schedule.

Embedded nonvolatile memories play an important role in view of the market demand for data storage without electricity supply. The main demand is for even smaller memory cells and lower programming voltages. The program partners have thus set their sights on even smaller structures (0.5-micrometer technology) and the incorporation of redundancy with the lowest possible number of additional or modified processing steps as compared with the basic process.

#### **Manufacturing Science and Technology**

A project central to the technology subprogram is the JESSI T-30 project on "Manufacturing Science and Technology" (see also the detailed article published in this issue), which sets out to bring the whole system of individual steps in integrated circuit manufacturing up to a level at which the devices can be produced at competitive costs. This task, which is largely underrated, and in Europe undervalued, requires detailed, painstaking work on practically all the aspects of a manufacturing operation.

The participants in the JESSI project have defined a number of performance indicators that can be used to rate, for instance, throughput time, the stability of individual



processes, the quality and reliability of individual appliances, appliance failure liability and repair time, and the like. The participants in the project decide together on the target levels for these performance indicators and allocate particular topics to the various partners. The results are then made available to all the participants, so that no one partner has to work on all the aspects to bring its manufacturing technology up to a competitive level.

Work on this project is being carried out in close cooperation with the manufacturing equipment and material suppliers, as it is precisely in the detailed work on refining the production process that many calls for, usually, minor modifications and improvements to manufacturing equipment and materials arise, and it is these that raise the performance indicators at the end of the day.

The project brought 0.7-micrometer manufacturing technology into the target performance indicator range in 1993, as demonstrated in the Regensburg and Agrade semiconductor factories. The results currently available augur well for the next technology generation with 0.5-micrometer structures. However, a number of new processes, new appliances, and, first and foremost, the rising demand for freedom from defects mean that additional investment in manufacturing technology development work is required.

#### Flexible Automated Wafer Production

In addition to these general aspects of wafer production effectiveness enhancement, the JESSI T-14 project on "Flexible Automated Wafer Production" is working on topics of special relevance to the production of Application-Specific Integrated Circuits (ASICs). The project is directly achieving the systematic application of SMIF (Standard Mechanical Interface) technology, developing a batch control system equal to the complexity of multi-product fabrication, and testing an automated wafer transport system. The project is also providing a number of equipment firms with a test platform for in-line appliance testing. (For example, chemical feed systems, wafer cleaning units, lacquering units, wafer inspection devices, and film thickness gauges.)

It has thus been possible to optimize a number of devices and tailor them more closely to the needs of an ASIC factory. SMIF technology is now an operational reality, and its first ASIC manufacturing runs have been successfully completed.

#### Germany: JESSI 0.25-Micrometer Project Reported

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[Article by Professor Roger de Keersmaecker, Associate Director of Interuniversity Microelectronics Center (IMEC), Louvain, and leader of JESSI ADEQUAT project: "ADEQUAT": "Development and Transfer of CMOS Logic Process Modules"; first paragraph is MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK introduction]

[Text] The ADEQUAT (Advanced Developments for Quarter-Micron CMOS [Complementary Metal-Oxide Semiconductor] Technologies) project's brief is to develop new component structures and process modules for 0.35- and 0.25-micrometer CMOS logic technologies. This new generation of components presents optimum properties and meets all requirements in terms of reliability and maximum manufacturing simplicity.

#### A Challenge for European Microelectronics

The rapid rise in plant and manufacturing and assembly equipment costs places a gigantic burden on European semiconductor manufacturers and greatly reduces their chances on the market, which is why joint work under programs such as ESPRIT (European Strategic Program for Research and Development in Information Technology) and JESSI (Joint European Submicron Silicon [Initiative]) was indentified early on as a helpful means of enhancing the efficiency of research and leading-edge development in microelectronics.

The packaging density of logic IC's [integrated circuits] has risen in parallel with that of DRAM's [Dynamic Random-Access Memories] over the last two decades, and system performance has risen in direct proportion to component speed. This constitutes a strong incentive to pursue the development of modern components. Now that this development has thrust deep into the submicrometer region, component design demands more than mere optimization and a compromise between a large number of requirements in terms of, for instance, material properties, component speed, parasitic induction, power consumption, reliability, and manufacturing potential. The ADEQUAT project was set up as a multidisciplinary framework within which this gigantic task was to be accomplished.

#### A European Consortium With Ambitious Plans

The ADEQUAT project consortium coordinates the work of eight teams—from the Dimes (Delft, Netherlands), Fraunhofer Society IIS-B [Institute of Integrated Circuits] in Erlangen and ISiT [Institute of Silicon Technology] in Berlin), GRESSI [Grenoble Submicronic Silicon] (Grenoble, France), and IMEC (Louvain, Belgium) R&D centers and R&D teams from industry (GEC Plessey Semiconductors/GMMT, Philips, SGS-Thomson, and Siemens—and 14 associated teams, mainly from universities. Up to 103 employees per year can be paid for out of the project's budget.

The project focuses on the rapid development and feasibility testing of individual process modules for 0.35- and 0.25-micrometer CMOS technologies. It does not set out to develop a complete 0.35- or 0.25-micrometer CMOS process, which would be directly application-dependent, as this would be beyond its scope. Nevertheless, there are direct links with the JESSI Joint Logic technology project, which is developing industrial processes.

The project schedule sets the deadline for the transfer of 0.35-micrometer front-end modules to industrial development lines at the end of 1993, with 0.35-micrometer back-end modules due to follow at the end of 1994. The equivalent 0.25-micrometer process modules are scheduled to be ready in 1995 and 1996 respectively. The lay-out

rules for the envisaged 0.35-micrometer technology and the preliminary draft of the rules for 0.25-micrometer technology are set out in the table with the lay-out rules for present-day 0.5-micrometer technology.

Lay-Out Rules for 3.3-V Technologies (all values expressed in micrometers)			
	0.5	0.35 (1)	0.25 (2)
Spacing between p- and n-zones	3.6	2.4	1.8
Shortest distance between active zones	1.6	1.1	0.8
Shortest distance between polysilicon zones	1.4	0.9	0.7
Spacing 1st metalization level	1.8	1.1	0.9
Spacing 2nd metalization level	2.2	1.1	0.9
Size of contacts between levels	0.8	0.5	0.3
Overlap zone above the contacts	0.4/0.3	0.25/0.2	0.15

(1) Rules for the lay-out envisaged by ADEQUAT (2) Preliminary rules for more advanced lay-outs, subject to confirmation.

#### Organization of the Project

Work on 0.35-micrometer lithography was performed during the first phase of the project (ESPRIT 7236). The feasibility of major front-end process steps was demonstrated in the fourth quarter of 1993, and this will lead to the optimization and consolidation of modern 0.35-micrometer front-end modules in 0.5-micrometer CMOS technologies in the first quarter of 1994. The work schedule also envisages the transfer to industry of these 0.35-micrometer front-end modules at the end of 1993.

The project revolves around work on process modules, which comprises:

- a study of scalability and the effect of design rules on electrical values;
- the development of process steps giving greater leeway, particularly as regards lateral isolation, potential barriers, and gate insulation;
- the development of new component architectures and wiring strategies, and
- the demonstration of the viability of the newly developed modules for the 0.35-micrometer steps in a 0.5-micrometer CMOS environment.

The advantages that the new modules could bring are being analyzed, such as improved component properties, greater freedom in manufacturing, better process control, and higher productivity, as they make for different decisions on the part of semiconductor manufacturers when the process modules are transferred.

In close collaboration with module development, work is under way on "basic process steps," in which alternative solutions for dielectrics, pn junctions, and metal leads are

being developed to provide sufficient leeway for scalability down to 0.25-micrometer technology.

The patterning sector comprises the development of the requisite lithography and etching tools, increasing weight being placed on deep-UV [ultraviolet] lithography. It is complemented by the modeling (computer simulation) sector, which is drawing up physical models for testing the process steps and the electrical behavior of the components.

The reliability and diagnostics sector is working on the software tools required for the quantitative assessment of the process and submicrometer-range component shapes, building on studies of the mechanisms capable of reducing component reliability.

The priority goal of these process developments is to enhance circuit speed and create new products that would not be possible with the available technologies. The JESSI Joint Logic (ESPRIT 7363) project, on which all the major European semiconductor manufacturers have joined forces, is working on the applications that benefit from this and the performance requirements that they pose. ADEQUAT runs parallel to this project on the engineering level, and this link has determined the direction and broadened the framework conditions set by other disciplines during the development work.

Moreover, all the participants from industry want to make use of know-how from the ADEQUAT modules in their pilot lines for the development of manufacturing processes for CMOS logic.

The work schedule for the second phase of the project (ESPRIT 8002) envisages expansion into the 0.25-micrometer range and the creation of 0.25-micrometer front-end modules in a 0.35-micrometer environment along the same lines. While this second project is under way, work on 0.35-micrometer back-end modules will also be pursued with vigor so that they can be transferred to industry in the second quarter of 1995.

#### Patterning: A Critical Dimension in Submicrometer Technology

The Patterning project is currently investigating various lithography processes for a 0.35-micrometer technology, the main focus centering on a wet-develop photoresist based on the negative UV photoresist (Shipley's SNR 48). The major problem in this type of photoresist application is posed by the reflections that occur on account of the high transparency of most photoresists in the deep-UV range (at a wavelength of 248 nanometers), giving rise to considerable fluctuations in line width. Several approaches to this problem have been tried out, including using colored photoresist, applying a nonreflecting coating to the upper or lower surface of the photoresist, and combinations of the two. Figures 1 to 3 [not shown] compare in-line SEM [Scanning Electron Microscope] images (viewed from above) of a polysilicon gate photoresist pattern using various processes.

#### Process Modules Combine Individual Manufacturing Steps

The various modules making up a CMOS process are set out in diagram form in figure 4 [not shown].

PMOS [p-channel metal-oxide semiconductor] transistors: The behavior of an oxynitride gate isolator as a borium barrier has been studied in depth with a view to improving p+ gates. NH<sub>3</sub> and N<sub>2</sub>O are the two candidates for thermal oxide nitration [Oxyd-Nitrierung] (kiln process or rapid thermal process). The resulting dielectric was characterized, giving highly encouraging results.

NMOS [n-channel metal oxide semiconductor] transistors: Drain fabrication, in which a high degree of protection against degradation by hot charge carriers and, consequently, high reliability, has to be achieved, constitutes the major difficulty in the manufacture of 0.35- and 0.25-micrometer components: Source and drain must be securely overlapped by the gate. Large-angle tilted implanted drains (LATID's) have mainly been used to date: The implant angle and energy are adjusted to set the position for maximum electrical field at the drain end without prejudice to the transistor characteristics.

#### **Synergy Between Research Teams and Semiconductor Manufacturers**

A unique industrial transfer strategy ensures that the transition from the conceptual stage at the R&D centers to the assessment stage in semiconductor factories takes as little time as possible. ADEQUAT makes for a common view of things within the consortium and brings what would otherwise be a lot of disjointed efforts under a single umbrella, following the same technological "roadmap." A component and process integration "roadmap" of this type shows the way for architecture modifications in component and process technology with a view to improving the user cost-benefit ratio even further. Each new process module developed by ADEQUAT is tested in precursor generation pilot lines. This provides an early demonstration of the module's viability in advance of the development of the complete industrial process and acceptance testing outside the project.

Manufacturability is a further point. It must be clearly understood that the cost-benefit ratio (Moore's law) represents a constant to be taken into account. The necessity of equipment reuse and process continuity sets limits on innovation. While the researchers work on revolutionary new steps, development continues within the bounds of the possible.

All R&D investments in research centers and development laboratories yield a profit in the form of ideas that hold out solutions to problems encountered in semiconductor technology. Nevertheless, there is a danger that many of these ideas will never be commercially exploited because of the enormous gap between initial idea and commercial exploitation. The transition from idea to mass production takes time and millions of ECU, and financial break-even is often achieved years after market launch. The ADEQUAT project consortium forms a sort of seed in which the R&D centers' know-how and skills and the semiconductor manufacturers' market and product knowledge have joined forces. It provides an intermediate stage between design, process development, and production and underpins the industry's medium-term commitment to the new processes that we need along the road to future CMOS logic process generations.

#### **Germany: JESSI Project Develops FPGA Design Tool**

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[Article by A. Ditzinger: "JESSI Project Advantage for FPGA Synthesis"; first paragraph is MIKROELEKTRONIK UND MIKROSYSTEMTECHNIK introduction]

[Text] JESSI [Joint European Submicron Silicon Initiative] project AC8, on "Synthesis, Optimization, and Analysis," is developing a tool that will provide the user with an intelligent facility for developing FPGA [Field-Programmable Gate Array] designs. Particular attention will be paid to the needs of small and medium-sized enterprises. The Computer Science Research Center (FZI) in Karlsruhe (Prof. W. Rosenstiel) and the Department of Circuit and System Design at the Technical University of Chemnitz-Zwickau (Prof. D. Mueller) are working alongside Isdata, the firm leading the project.

#### **FPGA's as Alternatives to ASIC's [Application-Specific Integrated Circuits]**

Field-programmable gate arrays, which are acquiring ever-increasing significance, represent a manufacturing alternative to mask-programmable ASIC's. These FPGA's combine the advantages of mask products in terms of complexity with the minimum investment risk of PLD's (programmable logic devices). Another reason why the market is shifting toward FPGA's is their short development time, which may be attributed to the fact that they can be programmed directly "on site." Various sources all suggest that FPGA applications will expand considerably over the next few years, for which period an average growth rate little short of 50 percent is forecast.

There are already more than 10 different firms supplying FPGA's or planning to supply them in the next few years. FPGA's with several thousand gates per chip can already be programmed, and FPGA's with a complexity of several tens of thousands of gate equivalents, which is entirely on a par with the complexity of mask-programmable gate arrays, are said to be in the pipeline.

Experience shows that standard description procedures and standard synthesis tools are only capable of producing marketable submodules, such as arithmetic components (adders etc.) and counter circuits (timers, clock generators, address generators, etc.) with either very poor results or enormously high computing power. More recent FPGA architectures are increasingly coming up with special modules that improve exploitation of the FPGA (e.g., in memory design) or make for faster design (e.g., specific "carry look ahead" logic). Special input and output cells are also envisaged and must be taken into account with the design tools developed. The problems thus lie less in the technological implementation of FPGA's than in the development of the requisite design tools, which must be both as inexpensive as possible so that they can readily be used by small and medium-sized enterprises, and sufficiently powerful and convenient to enable the system developer, the typical user, to design new ASIC's without extensive specialist knowledge.



This joint project was set up to develop a tool meeting these requirements. Each of the participants has undertaken tasks to which it can contribute the know-how previously acquired while carrying out other projects and research work.

#### The Participants in the Project

As an independent research institute, the FZI will be responsible for evaluating both new logic and high-level synthesis tools that are already available on the market and synthesis tools developed by the AC8 project. The FZI will also perform extensive experiments with the Callas and Caddy high-level synthesis tools, which are being used to synthesize a structure description from a VHDL [Very High Design Level] behavior description. They will primarily be used to work on applications of industrial relevance, the end in view being to reveal and record ways of integrating high-level and logic synthesis in the future.

The Technical University of Chemnitz-Zwickau is focusing on developing algorithms for FPGA and CPLD synthesizers customized for the device family or class concerned. In the light of the available results of scientific calibration work, the range of functions (counters, comparators, and more complex arithmetic functions) and the range of component families supported are being extended for data path synthesis. Design algorithms for further FPGA target technologies will be developed as the work on control unit synthesis proceeds.

Isdata is focusing initially on the integration of the logic synthesis tools developed during the project and on improving their marketability. In this connection, the integration of high-level and logic synthesis takes on an enormous importance. The integration of these various tools into a common design environment will make for intelligent operator prompting to support the designer in tool selection, design and part-design management and recycling, and in the observance of a certain design discipline and strategy. This capacity for integration will also ensure that more and more new tools can be incorporated. The synthesis procedures can thus be kept up-to-date, and the user will not have to make do with obsolete procedures.

#### Technology Transfer

In addition to the points set out above, transfer work also plays a major role in enhancing application-friendliness. This part of the project consists in building up knowledge of the concepts and algorithms used in high-level synthesis. Isdata, in conjunction with the Technical University of Chemnitz, AMEC (Applied Microelectronics Chemnitz), and FZI, is thus offering seminars to familiarize mainly small and medium-sized enterprises with the application potential of modern high-level synthesis. This both builds up user know-how, thus ensuring that the advance in productivity thus achieved is actually exploited, and constitutes a channel for manufacturers to provide extensive advice to users, thus guaranteeing that the user has a partner with whom his problems can be tackled.

The outcome of all this work will be incorporated later this year into Isdata's Windows-based tool, whereupon it will be available on the market, to small and medium-sized enterprises as well.

#### Germany: R&D Budget Again at 1993 Level

BR1808135794 Berlin DIE WELT in German  
16 Jul 94 p 11

[Article signed MK: "More Money for Research—Bonn Backs Key Technologies—Rexrodt Has To Tighten Belt"]

[Text] Bonn—After this year's reduction the budget for the [Federal] Research Ministry is planned to reach the 1993 level again in 1995. The Economics Ministry, however, will have fewer funds available next year, mainly because some projects related to the unity will expire.

In the view of Research Minister Paul Krueger, the research and innovation policy is a high priority for the Federal Government. This is reflected in the draft of the 1995 Federal budget passed yesterday in the cabinet. According to that draft, research spending is to increase by 2.7 percent or 250 million German marks [DM] to a total of DM9.47 billion.

Funds for the strategic key technologies of the 21st century, information technology, new materials, physical and chemical technologies, biological and transportation engineering, will be increased by DM70 million. An additional DM30 million is earmarked for prevention research. For these selective technologies DM1.5 billion are available in the budget. An amount of DM984 million is to flow into information and production technology, DM518 million into materials research.

The four-year, DM1.2 billion program for aviation research will be financed equally by the industry and the federal budget, with the Research Ministry paying 80 percent of the federal share. The 1995 budget will appropriate the first DM80 million in the Research Ministry's budget. Funds for space research will remain constant at DM1.6 billion.

The budget of the Economics Ministry will decrease by 14.5 percent to DM11.8 billion. Measures supporting the new Laender will absorb 58 percent or DM6.8 billion of the total expenses. The high reduction of total expenses is largely due to the scheduled phase-out of certain projects related to unity, such as the housing construction program for the withdrawing Russian troops (minus DM1.7 billion). In addition the subsidies for the coal mining industry will be lowered by DM590 million.

Increases are planned for a number of economic measures benefiting the new Laender. Primarily concerned are the investment subsidies as part of regional economic development measures (DM200 million), the equity support program (DM135 million), and the support of business-related research and development (DM107 million).

For the joint task of "improvement of the regional economic structure" a total of DM4.2 billion has been made available for 1995, which is DM200 million more than in the current year. Roughly DM250 million [more] have been appropriated for the support of small and medium-sized businesses, bringing the total to DM2.3 billion.

[Box, p 11]

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**Billions for Research**

- Large-scale research centers: DM1,054 million (+2.7 percent)
- Information technology: DM984 million (+3 percent)
- Environment, ecology, climate: DM756 million (+6.3 percent)
- Max Planck Association: DM702 million (+8.1 percent)
- Materials research, physical/chemical technologies: DM518 million (+3.3 percent)
- Biotechnology: DM307 million (+3.9 percent)
- Improvement of the framework agreements: DM225 million (+18.4 percent)
- Aerospace research: DM209 million (+8.9 percent)
- Ground transportation and traffic: DM180 million (+6.6 percent)

**Germany: Center for Advanced R&D To Be Set Up in Bonn**

M11808142594 Bonn TECHNOLOGIE-NACHRICHTEN  
MANAGEMENT-INFORMATIONEN in German  
30 Jun 94 p 3

[Text] Bonn is to get a top class international research institute, announced Dr. Gerhard Ziller, Secretary of State of the BMFT [Federal Ministry of Research and Technology], at the presentation of the CAESAR (Center of Advanced European Studies and Research) project. The establishment of this research institute, which will operate in the border areas between physics, chemistry, and biology, will make an important contribution to the further expansion of Bonn and of the region as a scientific location.

Together with the two planned universities in the districts of Rhine-Sieg and Ahrweiler, this project is right at the forefront of the government's compensation measures to Bonn and the region, to make up for losing Parliament and the seat of government. For over two and a half years, experts have been making preparations and plans to formulate proposals for the expansion of Bonn as a city of science.

Under the leadership of Prof. Ernst-Ludwig Winnacker of Munich University, the group of experts employed by the BMFT has submitted the project for a research institute unique in Germany. The research subjects themselves are unique: "Complex Molecular Systems and Their Interactions" and the "Organization and Internal Structure [of Molecular Systems]" are also completely new. The BMFT and the land of North Rhine-Westphalia intend to establish a foundation, the proceeds of which will cover operation of the CAESAR research center. A sum of 750 million German marks [DM] (DM685 million from federal government compensation funds and an additional DM65 million contributed by the land of North Rhine-Westphalia) will be provided for the foundation and investments. This means that the research establishment will be free to operate and develop independently from public budgetary regulations to the greatest possible extent. CAESAR will be oriented toward the international research environment; about one

third of the scientists will come from abroad to live and work in Bonn for a few years.

Dr. Ziller said he was especially pleased that not just the city of Bonn, but also Bonn University, Cologne University, and the Rhine Westphalian Technical College in Aachen are participating in the project. They anticipate a great boost both to their own scientific work and to education, whereas CAESAR is dependent on promotion opportunities at the universities. The project also envisages close collaboration between CAESAR and the region's existing nonuniversity research establishments.

The schedule makes provision for the policy decision to be made this summer in the Bonn Compensation Agreement. An establishment committee will then be set up to formulate further the contents of the establishment. It will start seeking the founding director and initial top researchers next year.

The institute will be built over several years. In the initial stage, approximately 30 teams can be financed for operational and investment expenditure with the available total volume of approximately DM750 million. Once the institute's work has started, subsidies for the foundation from the federal government and the government of North Rhine-Westphalia will be supplemented with industrial funding in the form of endowments, industrial donations, or by integrating industry-financed research groups into CAESAR.

**Germany: Steinbeis Foundation Aids Technology Transfer to Small Firms**

94WS0472A Duesseldorf HANDELSBLATT in German  
28 Jul 94 p 6

[Article by Roman Leuthner: "At the Service of Small Business," under the rubric: "Research/The Steinbeis Foundation of Stuttgart"]

[Text] The Steinbeis Foundation presents a "German Model" to counter complaints about endangering the technology site. The success of the Foundation demonstrates that dialog between science and industry can be organized efficiently and unhindered by bureaucracy.

27 July 1994—Stuttgart. "The Germans do research, the Japanese sell." This is one reproach addressed to research heard more and more often in the debate regarding the industry site of Germany. In the eyes of many experts, the obviously poorly organized dialog between science, industry and politics bears the main responsibility for the relative competitive weakness of German companies.

If it were up to the Steinbeis Foundation in Stuttgart, current research results would be transferred from the scientists to industry smoothly and efficiently. In this respect, the Foundation is a special partner for small businesses, as emphasized by its chief executive officer, Prof. Johann Lohn. Lohn has also been serving since 1983 as the governmental agent of Baden-Wuerttemberg responsible for technology transfer. He says pointedly, "The essential task of the Foundation consists of finding the correct scientific answers to technology-specific questions from small businesses and to bring companies together with suitable research institutes."

### **Independence Is the Basis for Success**

The Foundation traces its name to the "professor of modern industry support," Ferdinand von Steinbeis (1807-1893). The Foundation is organized as a private enterprise. Lohn considers this one "of the most important maxims because the necessary flexibility is ensured only in this way." Independence from political targets is the basis of success for the Steinbeis CEO. A prerequisite for this, however, is that the Foundation have access to an already existing research infrastructure, such as institutes of technology. Baden-Württemberg is investing 5 billion German marks [DM] annually in this "operating basis" that also includes the Max-Planck Institute and the Fraunhofer Institute.

In the past year (as of 31 December 1993), the Foundation had 2854 employees working on projects. The proportion of professors, engineers, physical scientists, business administrators and technicians responsible for project planning and implementation was about 70 percent. Students make up about 22 percent of employees. Lohn particularly emphasized that, "The number of employees for organization and administration was merely 8 percent." This clearly shows that the administrative branch is kept as small as possible.

### **Proven As a "Profit Center"**

Flexibility is the trump card. For Lohn, this also means that, "The apparatus has resources that can be retrenched." In plain language, this means that when one of the total of about 200 transfer centers of the Foundation is not running at full capacity because of a lack of contracts—and this happens every so often—it must be possible to "close it down." In this way in the past year, 56 new centers were opened but 12 had to be closed. If the government were influencing the Foundation, "weak centers might possibly belly up to the trough of the taxpayer forever." For this reason, the centers must not only prove themselves as a valuable source of knowledge but also as a "profit center."

The transfer centers are essentially distributed to Baden-Württemberg. Already 25 centers have been founded in the new Federal Lands. Steinbeis is also present in Austria. The Land of Thuringia, according to Lohn, also wants to found a similar organization. This is at the behest of the former Baden-Württemberg Prime Minister Lothar Spath who is now the manager of Zeiss/Jena.

The central office in Stuttgart is the administrative nerve center. At this location, all problems involving the topics of technology and management are analyzed in an initial step. The tasks are then coordinated and "handed off" to the experts in the transfer centers. Each of the individual centers is specialized in one area. Electronic image processing, sensor technology, communications technology, microelectronics, automation engineering, and marketing are only some of the areas from the comprehensive Steinbeis "catalog." Small businessmen can look for help in this catalog.

The strength of the consulting service lies in the philosophy of "benefit for the customer," as Lohn emphasizes repeatedly. "Only problem solutions logically tailored especially for the customer will be worthwhile for the

company." From Steinbeis, therefore, there is no "clothing from the rack." Fabricating "custom-made suits" for their customers is the motto that the people from Baden-Württemberg have written on their flag.

The advantages of know-how transfer benefit both sides, not only the customer but also the experts. The small businessman is purchasing knowledge that he can convert and use immediately for his purposes in his own company. For the experts, usually a professor at an institute of technology, an often not inconsiderable additional source of income opens up in return. The transferred knowledge is reserved for the company and is usually compensated for with a single payment. Consultant contracts or license fees are investigated only in the event of a longer-than-average-term utilization.

The Steinbeis Foundation works in an "economical" niche of know-how transfer. As explained by Lohn, it is possible to conclude DM1000 contracts because of the "flat" organization, decentralization and the efficient work organization in the profit centers. Other organizations won't even start at less than DM30,000 because their "apparatus" is too large and ponderous and must calculate every contract "from the volume point of view." The one-man shop that has an expert report done for DM1200 is not a rare case. The Steinbeis annual report for 1993 shows this. Of total revenues amounting to DM66.3 million, 80 percent were obtained from consulting, research and development activity with contracts having annual revenues of less than DM100 million each.

The "typical contract of a small businessman to the Foundation is the integration of highly specialized technologies into "obsolete" machines and systems, explains Lohn. Seen as a whole, he registers a concentration of requesting companies in the branches of mechanical engineering and systems engineering, electrotechnology and the automotive industry. This corresponds to the branch-specific distribution in Baden-Württemberg. In addition to this, these are the branches where the majority of automation processes occur with integrated services.

The technological development has "mixed up everything" in the past years, precisely in these industries. It is often the case that it is beyond the capabilities of small businesses to keep up to date with the new production methods. Consequently, it is not surprising that the Foundation provides more than 50 percent of its transfer services in the areas of microsystems technology in the controls area, measurement and control engineering, communications technology and electronics. However, the trend today is that the area of environmental engineering will soon take a large piece of the revenue pie.

### **There are enough requests for the Foundation**

In the meantime, the Steinbeis specialists no longer need to "practice acquisition on a large scale." About 15,000 requests were received in 1993. In 1993, a total of 17,000 projects were completed. This was distributed over about 2,000 "introductory consultations" that concentrate on management problems, 7,000 technology consultations and about 4,000 research and development projects, the cash cows of the Foundation. Over 2,000 expert report projects completed the range of projects. Lohn says, "Of



the roughly 10,000 industrial companies in Baden-Württemberg, we have already consulted with almost every one of them at some time." In addition, many consultations become self-perpetuating. Follow-on contracts arrive, diversification strategy consultations give rise to additional technology contracts. The result is that although the companies in Baden-Württemberg had to endure a reduction in revenues of 30 percent on average in 1993, the Foundation was able to maintain its revenue virtually at the level of the previous year.

### Germany: Max Planck Institute To Be Set Up in Greifswald

MI2208121494 Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German 22 Jun 94 p 3

[Text] The Senate of the Max Planck Society has approved the establishment of an institute, part of the Darmstadt-based Max Planck Institute of Plasma Physics (IPP), in Greifswald (Mecklenburg-Western Pomerania). The planned fusion experiment Wendelstein 7-X, currently under development in Garching, will be carried out at the new IPP institute.

Besides Wendelstein 7-X, the Ernst-Moritz Arndt University in Greifswald and the IPP have signed a cooperation agreement in the area of fusion-related plasma physics in order to introduce fusion research at Greifswald University. The investments required by the ambitious project amount to approximately 500 million German marks [DM], 45 percent of which is contributed by the European Union, about 50 percent by the Federal Ministry of Research and Technology, and the remaining 5 percent by the land of Mecklenburg-Western Pomerania. The project aims to reproduce solar energy on the Earth and to generate energy by melting atomic nuclei.

To start the fusion fire, the plasma must be surrounded by circular magnetic fields and heated at high temperatures over 100 million degrees Celsius. The planned fusion experiment Wendelstein 7-X is of the type of the "Stellarator" with which it has been possible to prove tested reactor suitability already in prototype models.

### Germany: Role of Max Planck Society in Basic Research Viewed

#### Activities of Society

94W50443A Duesseldorf HANDELSBLATT in German 11 Jul 94 p 5

[Article by Bettina Heimsoeth: "Activities in Society"]

[Text] The Max Planck Society is responsible for basic research. It can thus offer industry many productive research results. German industry, however, all too often leaves the field open to foreign companies.

In 1948 the Max Planck Society (MPG) was born out of the Kaiser Wilhelm Society for the Promotion of the Sciences, whose tradition it continues: efforts on behalf of basic research. That includes practical topics. Certainly, the MPG considers itself particularly responsible for subjects like astrophysics or biological cybernetics. But even at the time of the Kaiser Wilhelm Society there were institutes which

carried out research in areas—coal, for example—which had relevance for industry. Still, even here the questions posed were not to originate from the demands of industrial production. Rather, scientists pursued without time constraints questions which seemed interesting to them.

This basic principle operates today. So for example there is an institute for metals research in Stuttgart which investigates new materials, and one for polymer research in Mainz. The current president of the Max Planck Society, Hans F. Zacher, is very certain about this: "We have a good ensemble in chemistry and physics as well as in medicine and biology, and in this we are beneficial to Germany's position."

#### Practical Themes in the Program

Institutes dealing with the environment also receive fair representation. The institute for chemistry in Mainz works on air chemistry, and the institute for meteorology in Hamburg carries out research on the climate. Even evolutionary biology is no longer a purely theoretical subject anymore. Thus Manfred Eigen, a Max Planck scientist and Nobel Prize winner, co-founded a company which turns findings in evolutionary biology into practical use for pharmaceuticals.

Basic research often leads directly to technological progress. For example, biologists for the MPI [Max Planck Institute] for biochemistry in Martinsried near Munich were investigating metabolism in bacteria. In the course of their work they discovered that certain bacteria carry out photosynthesis: they transform sunlight into electrochemically, or biologically, available energy. They change their coloration in this process from purple to yellow. [From these findings] the researchers made a biological, optically usable storage material which won them the Phillip Morris Prize in 1993. Now films are coated with the coloring substance from the bacteria.

Even astronomy produced practical results when researchers were looking for a reflecting substrate without thermal expansion. This resulted in the glass ceramic "Zerodur," used by the Schott Glass Factory in Mainz to produce hotplates for stoves. And at the MPI for biophysical chemistry, a substance active in fighting tumors was discovered during research being done on phospholipids. The Asta Medica Company developed a pharmaceutical drug from the result of this finding.

However, German industry does not pick up all the research results from the Max Planck Society. The MPI for metals research has long been investigating the characteristics of high-tech ceramics. Japanese industry made use of the results—with a world market share today of 56 percent. The German share is 5 percent. At the MPI for flow research, attempts are being made to reduce the resistance to friction at the surface of bodies surrounded by current flow. Collaboration with a German chemical company to develop a film for coating the wings of aircraft did not materialize. In the meantime, U.S. companies are producing such coatings.

In the opinion of President Zacher, that is typical of the lack of readiness on the part of industry to take risks with

new products. "The Germans have been sapped by the long period of little challenge with too much competitive advantage."

The excellence of the research by the Max Planck Society is undisputed. Since 1945, 2,500 scientists in 69 institutes have produced 13 Nobel Prize winners. It is particularly the future-oriented projects which stand outside of the university-entrenched disciplines which come first there.

#### **New Research Goals in East Germany**

With ten newly founded [institutes] in the new federal states, the MPG now has a chance to tackle completely new research objectives. And there too "we are keeping the [expanse] of Germany with respect to location in mind," Zacher explains. An institute for microstructure was established in Halle, one for colloid and interface research in Potsdam.

Federal government cuts in financing which threaten the Society could severely impede the work of the MPG. The MPG, after all, gets about 90 percent of its financing from the federal government and states, each [sector providing] about half the funding. In all, the MPG had expenses of 1.6 billion German marks in 1993. That only corresponds to just the expenditures for a single large university. The year 1972 was also the last year of real growth for the MPG. In the second half of the 1980's when even the most urgent new plans could not be implemented, the federal government and the states guaranteed the MPG an annual increase of 5 percent for five years.

Now, however, according to Zacher, in addition to a one-time cut of about 2 percent in positions imposed within the scope of a federal consolidation program, the Society is in danger of losing this assurance. "This would paralyze our top-level research," he fears.

#### **President Defends Basic Research**

94WS0443B Duesseldorf *HANDELSBLATT* in German  
11 Jul 94 p 5

[Article by B.E.H.: "President Defends Basic Research"]

[Text] To Max Planck Society president, Prof. Hans F. Zacher, it is important that all approaches in research work in concert. Basic research also has its place in securing Germany's position in technology. "Since doing only research which is goal-directed limits knowledge," Zacher emphasizes. Applied research is directed toward things whose basic principles are already known. Only basic research can break open [established] paradigms. Time and again it turns directly into something practical. It holds powerful potential for innovation. According to Zacher, numerous examples from the Max Planck Society's research projects could serve to prove this. Without basic research we would cheat ourselves of much serendipitous knowledge.

But cooperation between research institutes and industry succeeds relatively seldom, he says. "For one thing, that is due to insufficient exchange of personnel between research and industry, which is hampered first of all by the differing legal conditions of employment." Another reason, however, is that the structure of our economy also brings

problems along with it. Understandably, an industry shaped by a market economy wants to use the results of research exclusively for its [own] purposes, whereas research institutes create knowledge which is to be accessible to the general public.

The question of the "correct order within industry" is also important in this context. The economic and political ability of manufacturers to get things accomplished—in the range from medium-sized up to major companies—is spread out unequally. Thus, advantages gained through access to the accomplishments of research intensify the structural differences within industry.

To improve cooperation, Zacher proposes that industry be more open to the results of German basic research. "When I ask the Max Planck Institutes where they are well received when they have something practical to offer, I always hear: in Japan or the U.S. Also, society needs to be relaxed and easy going with regard to the risks [involved] in new developments."

But to provide industry with usable results, the MPG needs a calculable budget development. "So far we have still been able to appoint top researchers," according to the president, "who demand expensive equipment." The concentration of top-level scientists dare not go down, particularly in comparison to the U.S. and Japan. "Since that would endanger Germany's technological position."

#### **Germany: Problems With Application of Research Results Viewed**

94P60348A Frankfurt/Main *FRANKFURTER ALLGEMEINE* in German 10 Aug 94 p 11

[Article entitled: "Use of Technical Subsidies Still Too Little"]

[Text] Too small a percentage of the results of information technology research institutes enter into products or economic applications. Nevertheless, the institutes are working with high efficiency. This is the result of an expert report which the ZVEI (Central Association of the Electrical Engineering Industry) produced for the German Ministry for Research. Hans Guenter Danielmeyer, member of the board of Siemens AG and chairman of the expert commission, said during the presentation of the report in Bonn that it is not due to a lack of effort that the innovative value of the work results are too meager. All the institutes desire to cooperate with industry. The companies are not making it clear enough as to what solutions they are expecting, he said.

Most of the time, the industrial applicability of the results are not considered until the work is finished, which is too late, according to the report. Too often the results are limited to reports and publications. Criticism was given to the duplicated work of the institutes on competing solutions or techniques, as well as the lack of coordination of the research subsidies of the laender. The report also mentions bureaucratic structures in the institutes, the lack of cost awareness, and a failure to meet deadlines in cooperation agreements.

The report recommends that the research institutes inform companies about their work when this work is still in the planning stage. The companies must communicate better

their medium and longterm goals to the institutes. The institutes should form centers of competence in microelectronics so that topics are better coordinated. The report advocates an increase in the government support of projects; the cutback for years in this support has been to the detriment of the basic financing of the institutes. Gebhard Ziller, state secretary in the Ministry for Research, said that this proposal is worthy of consideration. Ziller also noted the proposal that the institutes' future budgets should be based on accomplishments. "If we could do that, it would be a great step forward," said Ziller. But he raised the question of the criteria to be used to measure performance. The report suggested in this context the amount of contracts from industry and the number of inventions, patents, or licenses.

State research subsidies for information technology amount to 500 million German marks [DM], which the report considered a suitable amount. In addition, there are project subsidies in the same amount. Industry has stepped up its research contracts to the institutes. In 1993, these contracts totalled DM65 million, or 13 percent of the institutes' budget. Two years previously, the figure was 11 percent. But only the Fraunhofer institutes benefitted from this increase. Because of their need for a constant flow of contracts, their work is attuned to industry's short and medium term needs, according to the report. In contrast, industry contracts to the GMD (Society for Mathematics and Data Processing) have dropped. Likewise, the Juelich research center, the Karlsruhe nuclear research center and the Heinrich-Hertz-Institute for Communications Technology depend mainly on government basic financing.

#### **Germany: Demonstration Centers for Material Processing Subsidized**

*MI1808142494 Bonn TECHNOLOGIE-NACHRICHTEN  
MANAGEMENT-INFORMATIONEN in German  
30 Jun 94 pp 7-8*

[Text] As part of its materials research, the BMFT [Federal Ministry of Research and Technology] is funding innovative projects with the goal of incorporating material-specific advances into products and applications with future marketability.

New, efficient materials are extremely important for innovative applications in many sectors and key technology fields. For technical, but primarily for economic reasons, processing methods are especially significant here. Processing of new materials is a demanding procedure of ever increasing importance, which is essential to implement complex requirement profiles as well as customer's acceptance, thereby also to the wide use of new materials.

The demonstration centers for "Processing of New Materials" aim at a faster dissemination and application of R&D results, once a sufficiently demonstrable stage of maturity is reached, from the laboratories into broad industrial application. Establishment of a limited number of demonstration centers has proved helpful in line of principle in this context.

The demonstration centers are tasked for industry-related integration and demonstration of the state-of-the-art, especially for small- and medium-sized companies, with

emphasis on the new laender. Primarily, improvements to planning, implementation, and quality assurance are expected in new materials processing.

To fulfil these tasks, some of the services to be provided are the following:

- Practical evaluation and processing of research results;
- Advice to users and producers on processing-specific problems, going as far as specimen component production for documentation;
- Training and continuing education; the demonstration centers should enable industry employees and institute members to collaborate occasionally; in addition to general seminars, special company seminars, which have so far proved particularly successful, will be offered;
- PR work; exhibitions, associations, leaflets, lectures, publications, etc.

#### **Framework Conditions**

The range of tasks requires adequate staffing and equipment for the centers. As regards staff requirements, special knowledge of materials testing and modeling of material states is needed in addition to primary production know-how. The demonstration centers will not perform their own R&D. Intensive dialog, sometimes interdisciplinary, with research institutions, associations, etc. is to be fostered.

The criteria for locating promising demonstration centers are:

- Establishment (as know-how provider) at an institution performing specific application-oriented R&D in the region. However, the independence of the demonstration center within the institution should be guaranteed.
- Adequate regional and cross-regional environment of potential users, especially small- and medium-sized companies.

The centers are to be funded at a decreasing rate by the BMFT for up to five years. Subsequently, they are to be self-financing exclusively from their income, mainly through industry contracts.

The prime contractor for materials and raw materials research, Juelich Research Center, P.O. Box 1913, 52424 Juelich, tel: 02461/614891, fax: 02461/612398, has been commissioned to implement the "Demonstration Centers for Processing of New Materials" subsidy measures.

#### **German Research Ministry to Subsidize Software Development**

*94P60350A Duesseldorf HANDELSBLATT in German  
12/13 Aug 94 p 4*

[Article entitled: "Research Minister Krueger Starts a New Initiative"]

[Text] Federal Minister for Research and Technology Paul Krueger (CDU) has begun a new initiative to promote software technology in business, science, and technology. There will be state aid especially for cooperative projects



between research groups from the business world (software industry and users) and research institutes and universities.

Projects to be aided are those which serve to improve the managability of large application systems, Krueger said. He listed the following tasks for research and development: —development of techniques to model organizational and technical systems and processes; —further development and testing of methods and tools for the maintenance and reuse of application systems; and —further development of methods to improve the security and reliability of complex software systems.

According to Krueger, the initiative envisions 30 million German marks [DM] per year from 1995 to 1998 for these research and development projects; of this amount, the Ministry for Research and Technology will provide DM15 million per year. The projects are to be based on problems which arise from application programs used by business and industry. Therefore, the central handling of the cooperative projects will usually belong to the partner from business and industry. For small and medium companies, the initiative will offer projects with short and medium-term goals in small groups, in addition to the well-known subsidies, which have been raised by ten percent.

Information: DARA, Rudower Chaussee 5, 12489 Berlin.

#### **Germany's CDU Issues Paper on Research Policy**

94P60330A Duesseldorf *HANDELSBLATT in German*  
26 Jul 94 p 4

[Article entitled: "Eleven Key Points on Research Policy"]

[Text] In the opinion of the CDU [Christian Democratic Union], Germany can only be successful in the global economy if it follows the slogan of "growth from intelligence" by taking a top position worldwide, especially in the key and pacesetting technologies.

"Modern technologies and products are indispensable for maintaining international competitiveness," said Christian Lenzer, chairman of the CDU's Research and Technology Federal Committee during the presentation of eleven "Key Points for Future Research Policy."

The 7-page paper contains the following main points:

- German basic research should strive for a top position in the international competition. One must make use of new approaches for practical applications in a timely manner and one must especially support outstanding projects in the area of key technologies.
- Now that the rebuilding of institutional research in the new laender has been basically successful, it is necessary to develop the research infrastructure in a consistent manner. In particular, one should further expand the industry-related research infrastructure, facilitate the founding of technology enterprises, and promote research by small and medium-sized companies.
- To improve the investment climate, it is a priority task to continue the reform of the enterprise tax system. This includes special writeoffs for research investments and research personnel.
- Small and medium-sized companies with disproportionate expenditures for research and development need loans with reduced interest and grants, as well as more venture capital, preferably from private sources.
- Since Germany must continue to rely on a variety of energy sources, appropriate research should take place in all sectors.
- One should investigate if and how the actual separation between civilian and military research can be eliminated. This seems particularly logical in view of the arms conversion process.
- To ensure a flexible, effective research infrastructure, all initiatives in the private and public sectors should be coordinated in the future.
- One should continue the streamlining and deregulation in the state research and technology policies. Obstacles to innovation should be avoided from the beginning, and the approval process should be accelerated, especially for research investments and technological pilot projects.
- To improve the understanding of natural sciences and technology, science teaching in schools should be expanded. At the same time, scientists and researchers should try to get the public more interested in their work.
- In view of the challenges in the international markets, a combining of the technology forces in Europe is necessary. For example, duplicated developments, such as the TGV in France and the ICE [high speed trains] in Germany, should be avoided in the future.
- One should make it easier for highly qualified scientists to find a job. In its own interest, industry should provide work opportunities for young scientists, even in times of slow economic growth.

#### **Germany: BMFT Funds Information Exchange between Germany, CIS**

MI2208121694 Bonn *TECHNOLOGIE-NACHRICHTEN*  
*MANAGEMENT-INFORMATIONEN in German*  
31 May 94 p 6

[Text] The project KALINKA subsidized by the BMFT [Federal Ministry of Research and Technology] enables research organizations from the former Soviet Union to have access to international data networks. Above all, the information exchange between Russian and German physicists working at the experiments of the electron-proton-storage ring HERA at the German electron-proton-synchrotron DESY [German Synchrotron] in Hamburg, can be done more rapidly and efficiently.

Russian physicists can now participate more actively than before in international particle physics experiments such as H1 and Zeus. The new data network works at a transmission speed of 256 kbits/second. To date, only a much slower analog 4.8 kbits/second data link has been available.

Through KALINKA Russian scientists can have direct access to the German research network and consequently also to international research networks worldwide.

As part of this pilot project, the BMFT is also funding the so-called RADIO-MSU project of Moscow University which aims to set up directional radio links for communications. Such directional radio links are very important for Russia, since they can compensate for the current lack of efficient infrastructures for data communications. The digital microwave links permit a 2 Mbit/second data transfer speed and link the local networks of the institutes.

Even the communications capabilities of scientists at Moscow institutes could be improved by acquiring more modern relay and communications equipment. The institutes participating in the project (the Lebedjew Institute of Physics and the Institute of Theoretical and Experimental Physics) are already integrated in Moscow's fiber optic network currently under construction. This network will link the most important scientific institutes in the city.

In the future, other scientific institutes will be able to take advantage of the new infrastructure.

A similar project, always funded by the BMFT, aims to facilitate the access of research institutes in the Baltic states to the German and international data networks.

Funds of the International Federation for the Support of Cooperation among Scientists in the CIS (INTAS) have been disbursed to increase further the communications capabilities and to give access to data networks to scientific institutes in Ukraine and Belarus. A close coordination with the projects financed by the American International Scientific Foundation (ISF) has been organized in order to ensure a high efficacy of the subsidy measures.

#### **Germany: BMFT Launches Five-Year Program for Advanced Materials R&D**

BR270714494 Duesseldorf *HANDELSBLATT*  
in German 30 Jun 94 p 6

[Text] Germany leads the world in materials research. Federal Research Minister Krueger wants to further develop cooperation between science and industry in this field.

In the opinion of Federal Research Minister Paul Krueger (CDU [Christian Democratic Union]), new materials development involves a "high scientific, technical, and economic risk." It therefore needs government support. The new subsidy program "New Materials for Key 21st Century Technologies—MaTech" that Krueger presented yesterday therefore makes some 140 million German marks [DM] project funding available yearly from 1994 throughout 1999.

According to the Federal Research Ministry (BMFT), materials research funding in Germany currently totals some DM450 million a year. DM250 million of this is funding for scientific organizations, and the European Union (EU) makes DM60 million available.

As in the BMFT's previous program, "Materials Research 1985 To 1993," the goal is joint research, with research institutes and companies cooperating to share the work. Future joint projects would, Krueger said, be headed by the industrial partner, since it was contributing at least 50 percent of the funds.

MaTech builds on the previous program, whose outcome is viewed favorably. But since the new program focuses more on tying in basic materials research with industry's production-oriented research, it is better geared to Germany's industrial needs. The previous program had been appraised by Arthur D. Little. Krueger stressed that this comparison with Japan and the USA had shown that thanks to BMFT support, German materials research was in an "excellent position." MaTech will pinpoint "visions" for materials-related product developments in information, transport, energy, clinical, and manufacturing technology. In addition, completely new classes of materials, such as high temperature superconductors or intelligently reacting materials, could also give birth to new technologies. For example, research institutes in Dresden and Leipzig are working jointly with Daimler-Benz and Siemens on the synthesis of a new carbon compound that would be harder than diamonds. The BMFT was supporting the project with DM3.6 million.

Krueger cited as an example of an innovative outcome of the previous materials research program newly-developed ceramic valves used in engine building. A Max Planck Institute, Daimler-Benz and Hoechst had worked together on this. The product had proved its qualities in a test equal to one million kilometers' running: The valves required almost no lubricant, withstood high temperatures, and helped to reduce emissions.

Krueger stated that MaTech was coordinated with other subsidy measures, in particular in international cooperation and at European level. In line with EU Commission administrative practice, "cost"-based ceilings were applied to subsidies granted to companies for such projects.

These are up to 50 percent for industrial basic research and up to 25 percent for applied research and development. Preferential payments of up to 10 percentage points are granted for a "very high specific risk," to small and medium-sized firms, and for projects in the new Laender.

#### **Germany: BMFT Proposes Increased Funding for Key Technologies**

94WS0465B Frankfurt/Main *FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT*  
in German 18 Jul 94 p 10

[Article entitled: "Increased Funding for Key Technologies"]

[Text] Increased support for important key technologies such as information technology and materials research while, at the same time, assurance of basic research, are the focal points in the research budget for 1995. The Federal Ministry for Research made reference to this. The draft budget proposes funding of 9.47 billion German marks [DM], an increase of 2.7 percent over the available funds for 1994. In addition to this, there are DM130 million for refurbishing colleges in the new Federal Lands.

About DM1.5 billion DM are provided for the key technologies. Of this, DM984 million are earmarked just for information technology and manufacturing engineering. The funding for a "dynamic development" of biotechnology was increased by 9 percent to DM307 million. The

seed money to promote environmentally sensitive production methods and products was increased by 10 percent to DM290 million.

An initial installment of DM80 million is provided for the aerospace research program. This should reach about DM1.2 billion by 1998, half provided by the federal government and half by industry. The Federal Ministry for Research, with a view toward the already expressed fears of the aerospace industry, gave assurances that the federal funding for space research, including contributions to the European Space Agency, will remain constant at DM1.6 billion.

Within the framework of basic research, the Max-Planck Society will also receive five percent more funding from Bonn in the coming year. The support of the facilities of this Society in eastern Germany should increase by 30 percent due to investments because of the need of this region to catch up.

#### **German Study on Worldwide State Aid for Microelectronics**

94WS0463A Duesseldorf *HANDELSBLATT* in German  
20 Jul 94 p 10

[Article entitled: "Microelectronics/Institute for Economic Research (IFO) Study of Competition Bias in the Semiconductor Industry: Aid for Europe's Chip Manufacturers Supported"; first paragraph is an introduction]

[Text] State subsidizing of the key technology of microelectronics is markedly lower in Europe, especially in Germany, than in Asia and the U.S. The IFO institute, which has studied the competition bias, has developed industrial-policy recommendations for action.

Munich, Tuesday, 19 Jul 94 (*HANDELSBLATT*)—"The semiconductor industries in Asia, and especially in Korea and Taiwan, are benefiting most, on an international comparison basis, from government intervention. In contrast to this, the semiconductor industry in Germany is benefiting only to a below-average degree from government subsidizing." The Institute for Economic Research (IFO) in Munich comes to this conclusion in a thus far unpublished study made available to *HANDELSBLATT* and made at the request of the Federal Ministry of Economics.

The subsidizing of research and development (R&D) weighs most heavily among acts of government intervention. According to IFO, the rate of R&D subsidizing is the highest in the new Asian industrial countries, followed by Japan. There the industries specializing in semiconductors get not only R&D subsidies but also low-interest or even no-interest loans and tax benefits. In the U.S. the government has begun to replicate "industrial conversion" in its technology policy, i.e., to invest increasingly in civilian R&D subsidizing instead of in military.

IFO identified substantial differences in subsidizing—lower on the whole—in Europe. It is relatively poorly pronounced in Germany, while it is most strongly pronounced in France—indeed because of strong use of the government research infrastructure. Another important

message of the study is that, besides the degree of subsidizing, which is to be gauged more financially, the structure and organization of the national research systems especially play a decisive role.

As shown by the examples of Japan, Taiwan, the U.S. and France, research efficiency can be achieved by means of "results-oriented forms of dialogue and cooperation between the government and industry," without the necessity of increasing primarily financial R&D resources, it reads.

Measured in terms of the subsidizing of investment via investment subsidies, grants and credits and special depreciation allowances, as well as via tax reductions, Ireland is at the top because of its low tax rates and tax-exempt investment grants. Taiwan, Korea and Great Britain are close behind. The least favorable situations in this respect prevail in the U.S., Germany and Japan.

General location factors, like the availability of highly skilled manpower and the ability to use this manpower flexibly, as well as labor and production costs, are regarded as important determinants of competitiveness. IFO cites a study of the European Electronic Component Manufacturers Association that identified cost disadvantages for the location of Europe of 8 to 33 percent on average, depending on the product.

The smooth-flow supplying of chip manufacturers with machinery and equipment and materials is indispensable, according to IFO. There is a substantial deficiency here in Europe, because, according to IFO, the components-supplying and equipment industry "does not even exist" in important subsectors. The insufficient size of the European sales markets and the weakness of the applications' industries in contrast with Japan (entertainment electronics) and the U.S. (the computer industry) are acting as a handicap.

The institute deduces from the findings a need for action in economic, research and technology policy: For instance, "main products" are to be accorded first place and "norms and standards" are to be set for the chip applications industry. In this way chip manufacturers would have a frame of reference and could use their R&D money more purposively. However, for such an innovative plan "coordination between the government and industry" would have "to be substantially improved." According to IFO, the government research infrastructure would have to be used "more purposively for aiding the semiconductor industry." The research ministry could assume the role of moderator here.

"In order to revitalize and strengthen the European component-supplying industry," a semiconductor pilot line should be developed for the latest technology within the framework of the JESSI [Joint European Submicron Silicon Initiative] research initiative, in order to be able to develop and optimize products and equipment in interaction with the chip manufacturers. On the European level, the parceling of subsidy money for microelectronics and concentration on a few priorities seems wise, it says.

However, according to IFO, government intervention will solve only a part of the problem. Interviews of industry representatives showed that the general economic setting—



including in particular high wages and incidental personnel costs—are considered even more important than government subsidies and regulations. But economic policy and parties to a wage agreement are needed here, says IFO.

### France: 1995 S&T Projected Budget Figures

94WS0489A Paris AFP SCIENCES in French 28 Jul 94 p 1

[Report: "70 Billion Francs For Ministry of Higher Education and Research in 1995"]

[Text] Paris—The budget for the Ministry of Higher Education and Research will be 70 billion French francs [Fr] in 1995, with Fr40 billion going to higher education and Fr30 billion to research, it was learned from reliable sources on 28 July, after the ministry received the "ceiling letter" from Matignon [i.e., the prime minister's office] followed by a framework letter from Bercy [i.e., the Economic Affairs Ministry].

The civilian research and development budget (BCRD) will reach Fr90 billion, counting contributions from other ministries.

Details of the appropriation remain to be worked out in a process expected to be finished by early September, allowing Francois Fillon to present his itemized budget at that time.

Overall, the research budget will increase by 3.5 percent and the higher education budget by 4 percent, which—in the context of the austerity demanded by the prime minister—will be enough to maintain assets and personnel at the same level as last year, it was added.

"These augmentations are not negligible, given the considerable size of our baseline, for we are not a small ministry. And there is no reason to fear for the fate of research, despite what one morning paper has written," said the same source at the ministry.

There was some anxiety about the research budget when discussions with the Budget Ministry first got under way, it was added, "but our divergences were almost completely resolved, because we worked to reach consensus. Negotiations on higher education were harder, but the Budget Ministry had to take into account the fact there will be 5 percent more students in the new academic year."

As for the freeze in nonsalary spending in the 1994 budget, the situation remains as described by the minister, i.e., credits will be freed up as institutions begin the new academic year. The CNRS [National Scientific Research Center], for instance, reportedly has already drawn three-fourths of the subventions it requested.

### Netherlands Participation in EUREKA Projects Noted

BR0308135494 Amsterdam TECHNISCH WEEKBLAD in Dutch 15 Jun 94 p 1

[Article by Robert van Hattem: "The Netherlands Third In EUREKA Projects"]

[Text] Lillehammer—The Netherlands business community will again occupy third place among a total of 23 countries when approval for the new EUREKA [European

Research Coordination Agency] projects is announced. At the Ministerial conference on 15 June, yet another year of EUREKA was brought to a close.

Last week it was announced that last year Netherlands businesses and institutions had taken part in 45 of the 170 EUREKA projects now being concluded. That is similar to the dramatic drop in the number of companies carrying out independent product development, a surprisingly high percentage of 27 percent. Only Germany and France had more projects.

In general the projects produce technically successful results (87 percent in 1993). On the other hand, only one fifth of this number are commercially successful in the short term, although more than half still hope to attain good market results within three years.

Frederique Heering of Senter in the Hague expects that next year the Netherlands will be participating in about 40 projects, out of a total of some 110. A description of several of the projects still needs to be given in Lillehammer this week.

Philips Consumer Electronics will take part in the Advanced Digital Television Technologies program, which involves a total amount of ECU250 million.

For NedCar, a key role in the design of a medium-sized car with 40 percent less CO<sub>2</sub> emissions is of the greatest importance. "This could possibly be the last opportunity that the engineering division of NedCar will get to prove that they have a right to exist independently," according to Heering. Reason enough for the Ministry of Economic Affairs to be very actively involved with this international project.

### Netherlands: Information Technology Budget is Lowered to G116 Million

BR1808135394 Amsterdam TECHNISCH WEEKBLAD in Dutch 27 Jul 94 p 5

[Unattributed article: "PBTS Technology Program To Reduce Spending"]

[Text] Amsterdam—This year less money is available for the PBTS [Programmatic Industry-Orientated Technology Stimulation] scheme. The R&D subsidy budget will drop from 123.8 million guilders [G] in 1993 to G116 million.

The PBTS covers four main areas. They are environmental technology, information technology, biotechnology, and materials. Minister Andriessen announced in the STAATSCOURANT that in 1994 material technologies would be the largest single R&D funding item with G35 million. Environmental technology will drop from G38 to G32 million, taking it to second place. Information technology will receive G32.8 million and biotechnology remains unchanged at G18 million. In 1993 Senter, which implements the PBTS scheme, honored 296 subsidy applications. Forty percent of the applications come from companies which have not used these technology subsidies previously.

### Status, Trend of Italian Research Assessed

M11108091494 Milan IL GIORNALE in Italian  
19 Jun 94 p 9

[Article by Renato Ranghieri: "Archimedes No Longer Lives in Italy—Nothing is Invented—Scientists: It Is Fault of the Limited Funds Allocated for Research—For Every One Italian Researcher There Are 12 American"]

[Text] "Without adequate technical and scientific development there is a risk that our country will degenerate into an irreversible state of non-competitiveness. This is a grave moment." Then, one after another, figures were given that provide an idea of the depths to which Italy has fallen. Italy is the fourth or fifth world power economically, but it is not in the first 20 developed countries in the field of research and development.

The declaration was made by the AIRI [Association of Industries Engaged in Scientific and Technological Research in Italy], an association that represents more than a hundred companies that are engaged in scientific and technological research, in an "open letter" that has been sent to the heads of the parliamentary groups and to the members of the government, in the hope—says the president, Prof. Renato Ugo—of finally obtaining a positive reaction, given that for the first time some political forces have dedicated a space in their electoral programs to the subject of research and the university. Let us hope that they are not sailors' promises.

Let us return to the "open letter" that asks in a scholarly way why, despite our special gift of creativity, solid scientific foundations and pronounced business spirit, we have difficulty in fostering "a significant mass of innovative processes and products." As a result, the country's technological balance is suffering from a chronic deficit and our industry is poorly competitive in many medium and high technology sectors. Why does the OCSE [Organization for Economic Cooperation and Development] push our country down below the 20th position for research and development, and down much lower for higher education?

We can quickly reply to the last question by saying that we have transformed the universities into parking lots for the unemployed. Nearly 75 percent of a mass of students that is almost equal to that of America do not complete their degree courses.

According to the AIRI, Italy hardly dedicates 1.3 percent of its gross national product to scientific research. Our major competitors invest more than double this percentage: The U.S., Japan, Germany, and France invest between 2.4 and 2.9 percent. Even the United Kingdom and Sweden, who like us are feeling the effects of a burdensome economic crisis, are investing 2.2 percent of their gross national product. Professor Ugo gives an even more significant example, recalling how Finland's rate of growth has easily overtaken ours in the last decade.

The national technological balance is suffering from a deficit of about 700 billion lire a year, and this is also an indicator. In the same way the granting of international patents shows the depth of the abyss into which we have fallen: The requests presented to the European patent office two years ago saw the United States leading with

15,000 patents, followed by Japan with 12,500, then came Germany with 10,500, France with just under 5,000, and the United Kingdom that just reached 3,000. We were like a tail light with just over 2,000.

The total number of researchers is depressing. For every one of ours, there are 1.6 French or English, 2.3 German and a much larger number of Japanese (6) and American (12) researchers.

And then? Economic resources are lacking and consequently we must invest more than the current figure of just under 23 trillion lire in research in both the public and the private sectors. "However we must also harmonize, all working together, optimizing the potential of the private system—that is closer to the market—through efficient collaboration with the public research system (the universities, institutions, the CNR [National Research Council], the ENEA [National Agency for New Technologies, Energy and the Environment], the ASI [Italian Space Agency]...)"

We must reverse the trend to reduce research and to redimension centers that are even at an important level. "It would be very difficult to recreate the patrimony of specific competencies and extremely high specializations that is made up of researchers who are being forced to serve in other functions, and this would take a very long time and be extremely expensive," claims the president of the AIRI. The consequences can be imagined.

Then we only have to beat our chests for having thwarted the three-year plan that was presented in 1992 by the then minister Antonio Ruberti, who wanted to concentrate efforts into four principal sectors: space research, new materials, computers and telematics, and biotechnologies. The second three-year plan for 1994-96, presented by Umberto Colombo, the [former] minister and president of the ENEA, in January, has been reconsidered. In the plan it is claimed that Italy must "face the technological challenge decisively, because without a strong capacity to generate innovations it will be increasingly difficult to defend and improve the competitive position of our companies in an international context."

It is also claimed that "the technological challenge is so strong that Europe must have a common long-term strategy to face the threats that come, not only from the most aggressive competitors of the OCSE area (Japan and the U.S.), but also from the new industrialized countries, and from those that are in the process of industrialization and that are decisively staking on the advanced technologies."

Colombo stressed how the public resources that were committed to defense and space (about 50 percent of the total) are now being used to help companies working in the civilian sector in the United States. He also stressed that Japan is continuing with its policy of innovation, particularly through large industrial complexes with the support of the MITI [Ministry of International Trade and Industry] (a sort of Industry Ministry), and of an economic policy that favors the flow of financial resources to companies. Europe is fundamentally weak in face of these attacks. The partners favor their national positions, losing sight of the whole, in accordance with what has been defined as "hen house politics," when "beehive" politics should be adopted.

Europe is behind, and this is making the already dramatic employment problems even worse (- a million jobs in the two years 1992-1993 and today we are at the 18-million level). This is the reason for the urgency to accelerate technological innovation in Europe, and in particular in Italy, that is the flabby paunch of the community. This is why Italy must add at least 2 percent of its gross national product to research; increasing the sum available by about 10 trillion, a sum that is considered to be adequate to stop the recession and invert the direction of movement.

"Who would allow a masterpiece like the Sistine Chapel to be left to decay?—asks Professor Ugo. Certainly nobody would, because the basic culture of the Italians would not permit it. On the other hand, in the recent past, politicians, intellectuals, and economists have watched the decay of our national scientific and technological structure imperurbed. In Italy, science and technology are not considered to be either culture or business, but real optionals."

"I wonder if they are content abroad because we are demolishing our scientific and technological research," observed Rita Levi Montalcini, mortified because a decline in the level of Italy's scientific prestige had been ascertained. Certainly many industries in the principal countries want our fall, because they will gain advantage on the markets as a result of it. So we are risking becoming vassals, countries of the third world, while Italy is rich in creativity that is worth more than petroleum."

### Italian Research Faces Deep Crisis

M1108091194 Milan *IL GIORNALE in Italian*  
20 Jun 94 p 8

[Article by Renato Ranghieri: "Tangentopolis Has Killed Research—Nobel Prize Winner Dulbecco: "In Four Years Italy Has Reduced Funds by 20-25 Percent—Even the Defense Sector Is in a Crisis: The New Model Exists but It Is Not Proposed"]

[Text] Do we want to play a part in the world scene, or are we content to be spectators? The choice for our future lies entirely in this question. According to the experts, without exception, it is a future that is staked on scientific research and high technology. So far Italy has lost out on the stakes. In fact she has limited herself to an old jalousy that is taking her directly down to the second division.

The growth of a country depends on the dynamics of its industrial system, on the formation of new companies, and on the capacity that existing companies have to develop. Scientific research offers these possibilities; this is so true that, according to the EEC, the high technology sectors have the highest demand growth rate. Well, precisely in these sectors, our country has a negative commercial balance.

"We are living the consequences of a period of great folly," affirms Renato Ugo, president of the AIRI [Association of Industries Engaged in Scientific and Technological Research in Italy], and university lecturer, "a period that started in 1968 and still has not finished. A period of great utopia that has penalized us, and has almost made us aliens. We do not want to think that we are living in a competitive system. We must adapt ourselves to the market; otherwise, we will be left out."

So we have come to the moment for making strategic choices, and the role of scientific research is decisive. It is a real Cinderella as far as Italy is concerned in the consortium of developed countries. We are certainly one of the last to invest more, and also when it comes to investing better, making more rational use of resources, and making choices.

"It is obvious," burst out Engineer Pier Francesco Guarguaglini, president of Galileo, and managing director of Oto Melara, two leading defense companies, "it is enough to look at the condition in which we find ourselves. Military supplies have been reduced in the United States, but they have maintained the development of projects. Therefore research is continuing. The exact opposite is happening with us. Defense does not propose development studies because it has a tight budget. We have always provided our own funding, but if the sector is in crisis we cannot continue to scrape the barrel. Let us not forget that they have had enormous civilian spin-offs from military research. We are practically at zero in Italy now."

Guarguaglini can be considered as a measuring stick for the amount of research done in its sector. This is more or less one tenth of what is done in France. What is to be done? First of all the new defense model should be approved. Then choices that have goals should be made, so that we know where we want to go. "In a period in which we have been involved in wars and disturbances, the reduction of investments in the military sector means making it go bust, and I do not think that this is the best solution."

Another area that huge investments go into, and that could open up in the future is space research. The ASI [Italian Space Agency] is in a crisis, or better it is just coming out of one after having seen its management go under a commission, and it is still without a director general. The ASI is working on European programs that are funded by the community. Unfortunately, research on exclusively national projects is rarely conducted alongside these programs. This is another painful point.

This is why the lamentations of the researchers and scientists are so loud and unanimous. Very little is going the right way, despite the fact that there are some islands that are at the highest level, and a change of direction is pressing.

We have taken a step backwards. Why are we finding ourselves in this state? There are contingent reasons, and there are also "historical" reasons, as Prof. Franco Malerba, lecturer in industrial economics at Bocconi University and expert in technological innovations, research, and development, defines them. The allocations for research are modest in our country (less than half of those in others) and we are seeing the consequences. Funding was increased in the seventies, however "the difference has remained, and it is remaining because while we are walking the others are running." However, on the other hand, we must remember that we do not have a tradition of industrial research like the USA and Germany. Immediately after the war, apart from rare peaks of excellence like the Donegani or Elea, the first Olivetti computer, research has been almost absent. Then the recovery came, but with public programs that concerned the chemical and metal-working sectors rather than the more refined ones like



electronics, telematics, and pharmaceuticals. It is not without reason that the most important national pharmaceutical industry (of the little that has remained) has 1,500 employees and barely invests 200 billion in research.

La Roche alone has 8,000 employees and invests a trillion, while Glaxo invests double this amount. Our entire national chemical industry invests the same amount in research as Bayer does alone.

Let us not forget the sadly famous "nuclear moratorium" (that expired on 23 December 1992, without further decisions being made by the government) approved on the wave of post Chernobyl emotion, that has further limited Italian technological progress, as well as our independence as far as energy is concerned.

Prof. Renato Dulbecco, Nobel prize winner in 1975 for research in the field of tumors, who has returned to Italy after spending a long time in the United States, is also facing the problem of the dimensions.

For Dulbecco: "In the last three-four years the funds for research in Italy have progressively diminished in real terms by 20-25 percent. Research is not encouraged in this way. This is why many young people go abroad. There are some islands of research that are still going well."

"Funds are needed," insists Dulbecco; "this is why we are working with Professor Rossi Bernardi (former president of the CNR [National Research Council]) to create a foundation that gathers funds and is directed to the re-entry of our young researchers."

What do you suggest for improving the situation? "Increasing the exchanges between scientists. They should talk to each other more, a lot more. Italy has clever people that work in difficult conditions because of laboratories that are too small to allow interdisciplinary studies. Science needs foundations, and it also needs organization, and the organization consists in having potent research centers attended by a large number of scientists. Italy lacks these large centers. However, they would require enormous investments. I do not know if Italy could manage it."

"There are centers that are excellent, but at the same time we find ourselves in a position that is far from satisfactory." These are the words of Rita Levi Montalcini, the last Italian Nobel prize winner (1986: research on nerve fibers).

"People of great worth," said Levi Montalcini, "are not able to work in Italy, and must emigrate. This is what I am fighting for. I repeat, we have good things, but the current systems are not adequate either for funding or for supplying those with great merit with the conditions that they should have. Merit is not rewarded. There are too many centers. They are spread out, uncoordinated, and sometimes mediocre, not to say useless."

"Who should make provisions? The state, certainly, but above all industry. After Tangentopoli [current investigations into high-level corruption in Italy]," concludes the Nobel prize winner, "everything has been blocked. We must pay attention, because the contribution of industry is essential. Without it there would not be the enormous majority of the products that we use. Look at the pharmaceutical field. Our country must understand this, as it has been understood

abroad. Research and industry cannot remain strangers, because at least a large measure of the work that is done in the laboratories must have an effect on the market later. This is also why Italy has gone down a lot."

### Italy: Triennial R&D Plan Presented

94WS0487B Turin RICERCA & INNOVAZIONE  
in Italian No. 36-37, 1994 pp 20-21

[Article by Secondo Rolfo: "A Good Analysis Lacking in Proposals: Triennial R&D Plan Presented"]

[Text] The document is a departure for Italy, which until now has devoted scant attention to scientific research. The Plan attaches great importance to technological innovation, but focuses more attention on some objectives while neglecting others.

In March of this year, Minister Colombo presented the First Triennial R&D Plan provided for by Law 168/89. It is a departure for our country, which until now has devoted scant attention to research. Awareness of the role that technological innovation can play in determining the nation's competitive position is at the root of the document and of some fundamental choices on which it is important to dwell.

The first relates to the need for an additional financial outlay on research in the amount of 1.9 trillion lire in 1995 and 2.2 trillion lire in 1996.

The Plan in fact recognizes the need to increase the sum total of appropriations in this sector, even in a period of economic crisis, since they represent a kind of investment in the country's future. Even with these increases, however, Italy's R&D expenditures in 1996 will amount to 1.6 percent versus a European Community average of 2 percent [as published].

The second choice worthy of note relates to the intent to accord priority attention to the needs of the production sector, with a view to allocating funds based no longer on the supply side of research but rather on its demand side. In this regard, the Plan calls for two new National R&D Programs to get under way this year. These two research programs will concern the production systems and the textile industry, and are aimed at supporting and guiding Italian industry's innovative efforts in the traditional sectors that still constitute the hard core of Italy's productive activities.

These initiatives, however, and the financing of Science and Technology Parks in Southern Italy, are the only concrete choices presented in the Plan, which for the rest of it, notwithstanding its 311 pages, is sadly lacking in operative proposals.

Much of the Plan is consists of descriptive connotations. Its entire second part, relative to objectives, addresses the existing situation of Italian research in the various sectors with a statement on general objectives. What is lacking is a selection of objectives on the basis of their relative importance and of the capability of the Italian innovative system to achieve them, above all within the timeframe under consideration.

This basic shortcoming of the document is even more evident in its third part, titled "The Rationalization," in which the researchers themselves (for the most part from the public sector), as well as the instruments of research, are analyzed, as are also some specific objectives such as a realignment of land use, and transference of technologies. This part contains some very interesting reflections on university research, and on the role of advisory committees and inter-university consortiums. These are suggestions, however, and expressions of hope, but not guidelines; and this is partly because the entire treatment accorded by the Plan to public-sector research seems to be decidedly characterized by a hands-off approach and vagueness.

While the document lists the present (or past) plans of the CNR [National Research Council] and ASI [Italian Space Agency] in detail, it skips over these agencies' real problems, and sets such broad and general objectives as are obviously desirable, but does not indicate priorities, timeframes, or means of attainment. In regard to the CNR, for example, it cites as "most important objectives" nine points that are nothing more than a repetition of concepts and proposals that have been circulating for years within the agency.

As for specific objectives, the Plan focuses its attention on the program for the creation of science and technology parks in Southern Italy, as an instrument for the realignment of land use as well as the dissemination and transfer of innovation to PMI's [Small and Medium-Sized Industries]. That Italy clearly needs to begin creating complexes of this kind goes without saying. Questions arise, however, concerning, in the first place, the number of parks proposed for the South (13), which is deemed excessive by most experts because of the lack of the basic conditions in Southern Italy for their creation there (see P. Bianchi's most recent commentary in IL SOLE-24 ORE).

Also seemingly excessive is the Plan's emphasis on these parks, considering that such parks are only one, and certainly one of the most difficult and uncertain, of the possible instruments of innovation policy used in other countries. Proof of this is the high number of failures of such parks recorded throughout Europe, as well as the fact that, adjacent to such parks, our major competitors have

fielded instruments that are well articulated and flexible, easier to manage, and quicker to yield results. It is precisely from the standpoint of innovation policy that the Plan presents severe limitations in the form of its shortcomings with respect to the three groups of instruments commonly used to advantage in other countries, namely: development of a scientific infrastructure; large-scale basic-research projects; and technological transference.

As for the last of these three groups, the Plan concentrates exclusively, as pointed out above, on science and technology parks, while as regards the other two major groups, the Plan fails to address them in depth as to methodology and content. The statement of the Plan's intent to accord primacy to the needs of industry would seem to imply a shifting of funds from "big science" to applied research, but on this point the Plan is as extremely evasive as it is scant on details with regard to large-scale projects (beyond references to the EEC's framework program) and infrastructures.

Considering that the Plan was drawn up during the course of the debate in the United States on the new information superhighways, one cannot fail to note the Plan's failure to address these topics and problems relative to the projects launched by the Japanese and open to the Europeans and Americans.

These shortcomings in the Plan's approach to problems impugn the Plan's validity as a program. It is a good descriptive document, however, that accurately portrays the reality of the Italian research situation, and one that can therefore be used as the basis for drawing up a real plan of action that could be implemented during the 1994-1996 triennium.

The following two tables provide reference data for some of the areas the Plan intends to cover. These include that of autonomy for the universities, and coordination between scientific, technological, and industrial policies.

The first table shows R&D spending appropriations in Italy in 1992. They amounted to 22.5 trillion lire, of which 11.148 trillion were allocated to the government sector and 11.352 trillion to the enterprise sector.

The second table breaks out R&D spending by government research agencies alone, totaling 3.614 trillion lire.

Total R&D Spending Appropriations in 1992		
Sectors	Billions of Current Lire	Percent of Total
<b>Government Sector</b>		
Government administration	2,113	9.4
Universities	4,328	19.2
CNR	1,439	6.4
ENEA	776	3.4
INFN	461	2.0
Other research agencies	938	4.2
ASI	800	3.6
International contributions	218	1.0
Regional administrations	75	0.3
Total government sector	11,148	49.5
<b>Enterprise Sector</b>		
ENEL	497	2.2
State participation	2,910	13.0
Private sector	7,945	35.3
Total enterprise sector	11,352	50.5
Sum total in 1992	22,500	100.0

Source: ISRDS-CNR.

R&D Spending Appropriations in 1992 by Government Agencies	
Agency	Billions of Current Lire
CNR [National Research Council]	1,439
ENEA [Italian Committee for Research and Development of Nuclear and Alternative Energies]	776
INFN [National Institute for Nuclear Physics]	461
ISTAT [Central Statistics Institute]	390
ISS [Higher Institute of Health]	258
ISPESI	50
ING	47
OGS	31
Observers	26
INN [National Standards Institute]	17
ISPE [Institute for Studies in Economic Planning]	16
IEN	16
Other	87
Total	3,614

### CORPORATE ALLIANCES

#### France: Sanofi Buys Kodak's Sterling Drug

94WS0452A Paris L'USINE NOUVELLE in French  
30 Jun 94 p 32

[Article by Jacqueline Mattei: "Sanofi Banks on Effectiveness of Its Research"; Subheadline: "Sterling Purchase Opens U.S. Market to French Firm, a Coup If French Firm Successfully Introduces Original Molecules in Near Future"]

[Text] Sanofi lost no time snapping up Sterling Drug. Kodak had put its pharmaceutical subsidiary on the auction block last 2 May. On 22 June, the date that the priority granted him as a partner in the alliance concluded in 1991 expired, the French firm's CEO, Jean-Francois Dehecq, signed the agreement that was ratified the same evening by Kodak's board of directors.

Sanofi is buying Sterling Drug's ethical pharmaceuticals and, in turn, selling off its minority shares in Europe's self-treatment. The cost is 9.2 billion French francs [Fr] for

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total sales of 6.6 billion. That is 1.4 times the turnover, whereas Hoffmann-La Roche shelled out 2.4 times the turnover to buy Syntex. Enlarged by Sterling, Elf-Aquitaine's subsidiary has Fr16.5 billion sunk into drugs and ranks twentieth internationally, holding a 1.4 percent market share.

Focusing on drugs and beauty aids, Sanofi is banking on research, or rather, on the effectiveness of its research—it is selling off its bioactivities, above all, to pay for its acquisition. Jean-Francois Dehecq explains: "We would not have made that purchase three or four years ago, since we were not sure about the results of our research. Today, after 15 years of endeavor, we are two or three years away from successfully introducing original molecules on the market."

Sterling Drug's chief interest lies in its penetration in the hospital system in the U.S. market. That is a valuable asset for Sanofi at a time when the French laboratory believes it will soon have significant products to put on the world market. In 1991, Sanofi had 17 molecules in preclinical development and only nine in clinical phases; in 1994, it had five molecules in the preclinical stage, 25 in clinical phases and three in the process of being registered. The most promising—the antithrombotic Clopidogrel and an anti-angiotensive II for treatment of hypertension—are supposed to be introduced around 1997. By the year 2000 research activities on Alzheimer's disease should be concluded. The 1991 alliance with Sterling enabled Sanofi to accelerate the development of its portfolio.

After sharing costs, the French laboratory is eager to share the profits if its molecules turn out to be commercial successes. It remains to be seen if the results will meet expectations. The final clinical phases may hold some unpleasant surprises in store. But Jean-Francois Dehecq is confident: "I have had our research assessed by six European scientists. They confirm that our 'pipe-line' is outstanding."

Sterling's own research was not the primary reason for the purchase. But it does have the merit of providing a complement of short-term products. While Sanofi's most innovative products will not hit the market before 1997, Sterling could introduce, as early as 1995-1996, a product for cranial traumatism and cancer drugs for treatment of lymphomas and nervous system tumors.

Ultimately, merging Sanofi's and Sterling's (excluding the 1991 alliance) upstream research should enable economies of scale in pharmacology and toxicology. The objective is to trim the amount of research and development outlays to 15 percent of turnover, compared with 20 percent in 1993. With those savings, Jean-Francois Dehecq can increase his profitability from 10 to 15 percent as of next year. Analysts will be awaiting him in 1995 and scientists by 1997.

#### [Boxed Item]

**What Sanofi Is Selling Off Sterling's contrast products (for diagnostic imagery); sales of Fr2.7 billion with associated activities.**

Sanofi's bioactivities (gelatin, pectins, flavors, fifth quarter, animal health: totaling Fr7.1 billion in sales). About 10 candidates have already surfaced, specializing in fine chemistry, pharmaceuticals, agro-food industries.

Sanofi's share (47 percent) in Entremont: the Entremont family is responsible for finding a buyer.

Some beauty product labels. Not Yves Saint Laurent or the share in Yves Rocher. Almost surely not Roger Gallet or Van Cleef. For Nina Ricci, "It all depends on whether it fits into Sanofi's strategy or not": as principal shareholder, Sanofi has no management responsibility for the time being.

#### France: Preciflex Joint Venture of Renault Automation, ABB Robotics

94WS0489E Paris INDUSTRIES ET TECHNIQUES  
in French Jul 94 p 35

[Article by Thierry Mahe: "Marriage of Convenience Between Renault and ABB"]

[Text] Renault Automation and ABB Robotics have created a joint company, Preciflex, to develop automotive body assembly lines. It has been operational since April 1994.

Preciflex Systems has only been in existence since 16 April 1994, but the new-born company already "weighs in" at 400 million French francs [Fr] in turnover and 280 employees. Admittedly the parents—Renault Automation and ABB Robotics—were in a position to give it somewhat of a jump start. Renault has 18 years of experience in the domain of automobile assembly lines; ABB has a comfortable international position in the robotics field. Michel Come, president and general manager of Preciflex, says: "ABB's contribution is primarily strategic. It gives us an international opening we otherwise would have lacked." Indeed, while 90 percent of Renault Automation's sales are in France—mostly to its parent company, one suspects—Preciflex hopes half its sales will be outside France. One thing Michel Come has going for him is knowledge of what his turnover will be a year in advance, for that is the lag time between order and delivery to assembly lines of the welding "islands" for vehicle body parts. "A big delivery to Peugeot (Poissy) will account for 20 percent of 1994 sales. In addition, we are equipping the foundation assembly island for the Sevelnord plant at Valenciennes (Peugeot 806), a BMW line..." Other clients include Volkswagen, Volvo, and Saab. And besides its European clients, it has recently added the names of America's Big Three: GM, Ford, and Chrysler.

Profiflex designs robotized stations or "islands" for assemblage (by welding or bonding) of all or part of the automotive armature: the entire frame of the vehicle (foundation, sides, top, front and rear blocks, etc.), except for openables (doors, trunks, sun-roofs). For example, a body side has about 70 distinct components. Assembly islands are tailored to manufacturers' specifications, delivered on a turnkey basis to the steelworks, then validated on the first steel pressings before mass production begins.

This company, nearly one-third of whose employees are engineers or technicians, has more the air of a large study bureau than an engineering construction company... As Michel Come says, "most equipment is subcontracted, and

the engineering shop concentrates primarily on prototyping." Also, with the introduction of computer-aided design (CAD), most development work for at least the last 3 years has been done on computer work stations.

For the automotive industry, this is the age of simultaneous engineering: The manufacturing process is configured at the same time as the vehicle is designed. "Typically, we participate in the study phase (with the manufacturer's planning unit) more than a year in advance of the actual order, and our studies are complete about 18 months before vehicles start rolling off the assembly line. So for us, each project has about a 2-1/2 year life." To integrate the work of assembly-line design more fully into the manufacturing process, the firm has modeled its organizational form on that of the automotive builders. Thus about ten project leaders are in charge of everything, including on-site technical follow-up.

Further upstream, the process engineering department negotiates specifications with the builder, and clarifies management guidelines for the project. Once the order is signed, it is turned over to the project leader. The latter coordinates the work of a project team able to tap all of the enterprise's internal resources as needed: the research team (five or six people who elaborate technical solutions at the earliest possible stage, often in collaboration with technical centers such as the welding institute), a study bureau (50 people) divided into engineering teams (fluidics and automation), an advanced robotics unit, and departments to handle subcontracting, purchases, and fabrication. Daniel Bidaud is manager of the technical department, and in that capacity he supervises all these technical nodes and assets. He explains: "During the 14 to 16 months of study, all possible efforts are made to insulate the study bureau from external perturbations." That glib understatement alludes to the incessant stream of modifications ordered by the builder: on average, about 150 generations of changes over the life of a project.

Digital definition of vehicle bodies was where CAD got its start. Today it is omnipresent. Definition of vehicle body parts is 100-percent digitized, and robots are programmed semi-automatically to adjust to the varying geometry of pressed-steel pieces. At the end of the project, the bundle of planning documents turned over to the builder is mostly symbolic. In that connection, Preciflex's technical department has an impressive panoply of study and simulation software: Several dozen stations are equipped with engineering software including X-Elec (computer-assisted wiring design), Euclid (engineering CAD), Prosyst (programmable automata simulations), and Rop-Cad (robotic simulations).

According to Preciflex officials, the most striking advance in the field of metalwork is in laser welding, which is growing rapidly. Improvements in the fabrication process flow from improvements in body design: less sheet-metal surface area, tighter tolerances, etc. And of course, for the consumer, constant improvements in quality and esthetics.

[box, p 35]

#### General Assemblage

Automobile bodies get their distinctive shape from their different components: foundation, sides, top., etc. The

process of "geometrization," currently accurate to within 0.5 to 1 mm, is managed by the Preciflex system patented by Renault Automation. This "octopus" with articulated arms (up to six robots) is remarkable primarily for its flexibility. In a Renault factory in Spain (Valencia), the system is adapted to five different types of vehicles: R9, R19, R21, a station-wagon model, and the successor to the R19. Tooling reconfiguration is effected in real time, to sustain a production tempo of 60 vehicles per hour. The device has been very successful with the American automotive industry, since Chrysler, Ford, and GM between them have purchased no fewer than 14 of them. "Octopus" sales alone are responsible for at least half of Preciflex's turnover. [end box]

#### France: Bull, Syseca Create Transtar Software Subsidiary

94WS0481B Paris 01 INFORMATIQUE in French  
8 Jul 94 p 6

[Unattributed article: "Software Engineering: Bull and Syseca Create Transtar"]

[Text] A new software-engineering public pole was just formed, with the creation of Transtar, a joint subsidiary of Bull (65 percent) and Syseca (35 percent). This company, with a capital of 2 million French francs [Fr.], will market Bull's IDS (Integrated System Development) products as well as products designed around a version of the PCTE (Portable Common Tool Environment) standard that the two shareholders developed within the Emeraude GIE [economic interest group].

Transtar will succeed the defunct French Software-Engineering Company (SFGL), a subsidiary of Cap Gemini, Cisi, Steria, Sema Group, Bull, and Syseca, which the latter two companies recently took over. "It is in fact because we were not satisfied with the results of SFGL that we created Transtar, a company more strongly geared to marketing," Alain Couer, general manager of Bull's Open Systems & software Division, explained. Transtar will give priority to the development of its distribution channels in the United States (where Alsys, the Syseca subsidiary, will be its strong arm) and in Europe. Pierre Sevray, CEO [chief executive officer] of Transtar, pointed out. He also mentioned negotiations with Ibsi, the France Telecom subsidiary. Started two years ago, "they slowed down while the Bull management changed, but that does not mean that they will not succeed," Claude Jeanne, the Ibsi CEO, indicated.

#### France: Ibsi Cegelog, American Legent Sign Marketing Agreement

94WS0481C Paris 01 INFORMATIQUE in French  
8 Jul 94 p 5

[Unattributed article: "Development: Ibsi Cegelog Strengthens Its Client-Server Line"]

[Text] Ibsi Cegelog and the U.S. publisher Legent have signed a distribution agreement for two products, Endeavor/Teamnet for configuration control, and Distribulink/Unix for software cablecasting. Endeavor/Teamnet is Legent's version-management and configuration-control

tool under Unix. It makes it possible to control development modules (programs, documentation, etc.) within a single repository. Installed on a Sun server (or an HP server by the end of the year), it provides access to that server from any client station in the NFS [Network File System] network. Distribulink/Unix makes possible the automatic cablecasting of software from servers running under Unix (AIX [Advanced Interactive Executive], HP-UX, Sun OS [Operating System], or SCO) to clients under MS-DOS, Windows, OS/2, and the most common Unix programs on the market. Distribulink/Unix operates under TCP/IP [Transmission Control Protocol/Internet Protocol] or in asynchronous mode, and relies on the Xcom/Mlink file transfer system. After starting distribution of the Dynasty software-development environment, Ibsi Cegelog thus significantly strengthens its client-server offer and clearly positions itself, according to its president, Christian Garcia-Cavalié, "as a software-engineering package integrator."

#### **France: Pixel, IBM Set Up Joint Flat Panel Display Plant**

94WS0451A Paris L'USINE NOUVELLE in French  
7 Jul 94 p 34

[Article by Valerie Godzinski: "Projected Plants: Pixel Sets Up Shop in IBM's Industrial Park"—first paragraph is L'USINE NOUVELLE introduction]

[Text] Pixel International will produce flat-panel field-emission displays [FEDs] in IBM's industrial park, in Montpellier. Within three years, 130 million [French] francs [Fr] will be invested.

Created in 1992 by Jean-Luc Grand-Clement, the French company Pixel International, headquartered near Aix-en-Provence, has decided to industrialize the technology of flat-panel FEDs, also called "micropoint displays," on which it has exclusive rights. The company works in partnership with the optoelectronics laboratory of the LETI [Laboratory for Electronics and Data Processing Technologies], the research laboratory of the Atomic Energy Commission [CEA] in Grenoble, where its research and development departments, with a staff of 35, are located.

"We now want to show that this technology can be industrialized, and to manufacture products on that basis," Philippe Oudot, vice-president of Pixel operations and future manager of the Montpellier plant, stated. After hesitating between Aix-en-Provence, Grenoble, and Sophia-Antipolis, the company finally chose to set up its pilot production line in the industrial and technological park created by IBM to turn part of its site to new uses. "The infrastructures already in place will enable us to accelerate our installation," Philippe Oudot added. In fact, the company will take over some 1,000 m<sup>2</sup> of clean rooms and 600 m<sup>2</sup> of office space and workshops. "We must face some constraints resulting from the structure of the buildings, but they do not pose any serious problems. We shall build clean rooms inside the existing ones, because we want them more sophisticated, more high-tech, and 100 times cleaner than IBM's," the future manager added.

#### **Production Could Start in October**

Pixel and IBM will spend Fr14 million to reorganize the premises, and Pixel will add Fr86 million this year for production equipment. Within the next three years, the company will invest an additional Fr30 million on the site.

Work should be completed by the end of July, and production could start next October. By the end of the year, the staff will number some 50 people, divided into two production teams; it will number as many as 120 in two years from now. Production will increase at the same rate: initially, the Montpellier plant will produce 20,000 displays per year, and eventually about 70,000 units.

These flat-panel displays will be destined mostly to applications with a high added value, especially in the military sector and telecommunications. As for mass production, it will be ensured by large industrial groups working under technology-transfer contracts.

Three "cooperation and licensing agreements" have already been signed: one with Texas Instruments, a U.S. company that wishes to develop the process for its portable computer displays; the other with the Japanese Futaba, which wants to diversify in radio guidance applications; and the third one with Raytheon, a U.S. company specialized in military applications involving displays in hostile environments. Pixel, to which these partnerships bring royalties and technological rights of access, would like to sign another three contracts of that type in the fields of telecommunications and consumer electronics.

[Box, p 34]

#### **The Financial Arrangement**

- Created in 1992, Pixel International achieved sales of Fr13 million in 1993.
- Global investment: Fr130 million.
- Fr100 million will be invested this year, and financed as follows:

—70 percent self-financed through venture-capital companies, with European companies holding 60 percent of the equity capital, and U.S. companies the remaining 40 percent;

—close to 20 percent by banks (leasing, intermediate-term loans);

—about 10 percent by a subsidy from ANVAR [National Agency for the Implementation of Research].

Minimal subsidies from local communities, although they have guaranteed the loans.

Employment subsidies from IBM, but based on recruitment among IBM employees.

#### **France's Yonowat, American Ashlar Create CAD/CAM Partnership**

94WS0451B Paris L'USINE NOUVELLE in French  
7 Jul 94 p 53

[Article by Thierry Lucas: "Partnerships: How To Export Software to the United States"—first paragraph is L'USINE NOUVELLE introduction]



[Text] Relying on a partner, Designvision, which acted as an "impresario," the French PME [small to mid-size company] Yonowat just signed an \$8-million contract with Ashlar, the publisher of CAD [computer-aided design] software.

In data processing, it is a known principle: get recognition for your product in the United States, the rest of the market will follow. Including your own country's market. This principle was applied by Yonowat, a young company that developed a three-dimensional graphic-modeling software program for designers, architects, and more generally all those who create images. Ashlar, the U.S. CAD software publisher, just signed with Yonowat a three-year \$8-million dollar contract that provides for the sale of at least 17,000 product licenses on the other side of the Atlantic. "We are positioned in a narrow market, where a product can last only if it quickly achieves international distribution," Alain Lootgieter, the Yonowat marketing manager, pointed out.

Its entry on the U.S. market, which translates into a spectacular change of scale for this PME with a staff of 5, began with a meeting with Dominique Gatto, vice-president of Designvision. "Designvision's calling is to look for new technologies in graphics software and promote their worldwide distribution," Dominique Gatto explained. "But we are not interested in being mere go-betweens." Rather, Designvision sees its role as that of a talent agent capable of finding talents, persuading those who have the means to implement them commercially, and above all to reconcile as best as possible the ambitions of both parties.

The first stage, and not the least was to persuade the U.S. software publisher to really consider the advantages of a French product... "Our job was to demonstrate to Ashlar the value of Yonowat's technology, and also to initiate the software authors into market realities," Dominique Gatto added.

Thanks to this partnership, Yonowat can remain an R&D company that develops and improves its graphic technologies, without having to publish or distribute them, which is not its job. Other joint operations with Designvision are in progress. The software will be distributed in Italy by Modo, the leading Italian distributor of graphic data-processing software. In addition, negotiations with major CAD companies are in progress.

[Box, p 53]

#### A Creative Tool

Starting from the idea that graphic modeling software is too technical for creators, Laurent Billy and Jean-Marc Noirot-Cosson, founders of Yonowat, designed an intuitive tool to construct "freehand" forms. Three years of work yielded a first commercial product (Amapi) introduced at the MICAD show in 1993. Its main advantage is a simple man-machine interface that favors the visualization and interactive modification of the objects created on the display. Over 200 copies of the Amapi software were sold in France.

#### France's SAT, Sweden's Ericsson Create Eritelcom Subsidiary

94WS0451C Paris L'USINE NOUVELLE in French  
14 Jul 94 p 18

[Article by Jean-Pierre Jolivet: "They Form a Partnership: SAT [Telecommunications Company] and Ericsson Provide the Connection"—first paragraph is L'USINE NOUVELLE introduction]

[Text] The French and Swedish companies just created Eritelcom. This joint subsidiary will be in charge of marketing their private automatic branch exchanges [PABXs] in France.

One company was marking time on a difficult market. The other wanted to make a comeback on the French private-telephone market. These two reasons prompted the French SAT and the Swedish Ericsson to form a partnership. On 1 July, the two partners created a joint subsidiary, named Eritelcom, to market their PABXs on the French market.

#### The Partners Count on Complementary Product Lines

Employing 170 people coming from SAT and Ericsson SA, the new company aims to achieve sales of 200 million [French] francs [Fr] already this year. "Our objective is to gain one market-share point every year. Below the 20-percent mark, a manufacturer does not have a stable position on the market," Gilles Pichon, the Eritelcom CEO [chief executive officer] indicated.

The new company still has a long way to go, considering SAT's 10-percent share of the French PABX market, and the fact that the market is quite depressed and declined by more than 10 percent in 1993.

To meet the challenge, the partners count on the complementary-line effect. For several years, SAT focused its efforts on the development of small and medium-capacity equipment. Its Telcom line meets the needs for 200 to 500 lines. For their part, Ericsson's MD-110 PABXs, which the DGPT (General Directorate of Post and Telecommunications) just approved, boast capacities of 300 to 25,000 lines.

SAT, whose PABX sales amount to some Fr200 million, brings to Eritelcom its distribution and after-sales service networks, a must in this field. Its seven regional offices and over 400 distributors and installers cover the French territory.

As for Ericsson, it will be in charge of marketing the French company's equipment on foreign markets. Established in 65 countries, it thus opens new prospects for SAT, which is not well represented on export markets.

Although the two companies decided to go on producing each their own equipment, they have added a technological facet to their partnership. Eritelcom will take part in the development of Ericsson's new PABXs. SAT's expertise, especially with respect to ISDN (integrated-services digital network), is thus transferred to the new company.

Ericsson makes a remarked comeback, 20 years after being evicted because of the reorganization of the French telephone service and... selling its activities to Thomson.

The Swedish company, the sixth largest manufacturer of telecommunication equipment worldwide, could not accept much longer not to be represented on the French private-telephone market. Especially at a time when technologies and the European trend toward deregulation herald a new deal.

Its partnership with SAT in Eritelcom, which is managed by Gilles Pichon (who is also the CEO of Ericsson SA), will now enable it to be one of the players who count in France.

[Box, p 18]

#### **Wireless Technologies Are Part of the Dowry**

Wireless telephone service will be one of the strong points of the Eritelcom company, which will market SAT's CT2 and Ericsson's DECT [Digital European Cordless Telecommunications] PABXs.

Although some consider that these two technologies are rivals, they are also complementary. The first one, for which terminals are already available, offers the advantage of being compatible with the public networks—of the Bi-Bop type—that are being installed. The other one is an improved version. With three times the capacity of the first one (120 transmission channels), it is suitable for data-type transmissions (fax, messaging, file transfer).

[Box, p 18]

#### **The Partners**

##### **SAT, Business Communications Division**

- Sales: Fr870 million (subsidiaries included).
- Personnel: 300.
- This division of the SAGEM [Company for General Applications of Electricity and Mechanics] group's subsidiary is represented on the following markets: PABX and associated terminals, modems and network adapters, interconnection and video-communication equipment.

##### **Ericsson SA**

- Sales: Fr247 million.
- Personnel: 42.
- Created in 1993, the French subsidiary of the Swedish Ericsson covers the sectors of cellular telephony, business communications, radio-relay systems, mobile data transmission, and electronic components. Ericsson SA achieves one half of its sales in radiocommunications.

#### **France: Thomson-CSF, Thomson Consumer Electronics Merger Planned**

94WS0451D Paris L'USINE NOUVELLE in French  
14 Jul 94 p 20

[Article by Jean-Pierre Jolivet: "Electronics: Thomson Intends to Muster Its Forces"—first paragraph is L'USINE NOUVELLE introduction]

[Text] Only just reappointed as president of Thomson, the company he has been heading for 12 years, Alain Gomez intends to rebuild the group.

Alain Gomez never fails to strike while the iron is hot. Only just reappointed president of Thomson, he takes up the case of the rapprochement between Thomson-CSF (professional electronics) and Thomson Consumer Electronics [TCE]. The operation will start with the merger of Thomson SA, owned by the state, and Thomson-CSF, 42 percent of which is traded on the stock exchange.

This major task is part of a privatization that, it is hoped, will take place in 1995. "The best privatization method will be the one that will lead to the real creation of the Thomson group," Alain Gomez insists. The course is set. It is the result of a study of the future of Thomson made by its management at the request of its public shareholder. The scenario is rather far from the tentative approach of early 1990, to relieve the group of its consumer-electronics and semiconductor losses by letting go TCE and SGS-Thomson. But the Thomson CEO's adaptability is well known. And, of course, times have changed.

#### **A Major Turning Point: Multimedia Systems**

Technology is currently shattering the barriers that exist between the group's military and civil activities. Because of defense budget cuts, military contracts have become accessible to civil equipment, which is often less expensive. A lot of the communication equipment and computer hardware used by the armed forces comes from the civil sector. Conversely, technologies that were developed for military equipment are finding new civil applications. Thomson-CSF already achieves 30 percent of its 34.3-billion-francs [Fr] sales in the civil sector, compared with hardly 23 percent two years ago.

The management of Thomson-CSF is again talking about diversification. Last April, the CGT [General Confederation of Labor] made public a report on the subject that it had written at the management's request. While the results remain mixed, the first steps were taken to develop technological synergism in all fields: electronic car, detection of stolen vehicles, pay television, computerized banking, and security.

But, for Thomson, the major turning point of the nineties will be that of multimedia and information systems, domains located at the confluence of telecommunication, data-processing, and consumer-electronics technologies. With a common denominator: digital signal processing techniques, which are widely used in defense electronics and fully mastered by Thomson-CSF. TCE already markets them in the United States, in equipment that makes it possible to receive the satellite digital-television programs (Direct TV) offered by Hughes.

This technological breakthrough comes at the right time, as TCE's consumer electronics confirm its painful recovery. For the first time since 1990, TCE displayed positive operating results: Fr155 million in 1993. Its recovery on the American market (+19 percent), where TCE achieves over 50 percent of its sales, enabled it to ring up Fr33.5 billion in sales, up 10 percent.

The rapprochement between Thomson-CSF and TCE under a single banner is a way of making the most of technological synergism. Alain Gomez also sees synergism in SGS-Thomson, in which Thomson-CSF still has a

24-percent interest. The French-Italian semiconductor manufacturer (which is back into shape, with a profit of \$311 million for sales of \$2 billion, and an operating margin that tripled in one year) is one of the main suppliers of the chips that TCE will need. It is therefore of strategic importance for the development of digital television and multimedia systems. "SGS-Thomson could become the third pole of activity of the group if there is a merger between Thomson-CSF and TCE," Alain Gomez indicated.

There is no lack of obstacles to the implementation of this project. The debt of TCE—close to Fr10 billion—will have to be reduced; as will the Fr8 billion of Thomson SA. The debt-reduction operation may prove difficult. Thomson-CSF, which has engaged in a strategy of sustained external growth, needs its own capital. Excluding its acquisitions, the company as it was in 1989 would have generated only Fr24 billion in 1993. The group will also have to manage its interest in Credit Lyonnais, which caused Thomson-CSF to operate in the red and brought about a loss of Fr2.3 billion.

Although some had reservations, Alain Gomez was reappointed president of Thomson because he fought for this project. The task is a dangerous one. Especially considering that its implementation must fit into the privatization timetable.

#### Industries With Increasingly Similar Technologies

Thomson SA owns:

- 100 percent of Thomson Consumer Electronics. Sales: Fr33 billion. Activities: Television sets, Videocassette recorders, Camcorders, Audio equipment, Television tubes
- 58 percent of Thomson-CSF (professional electronics). Sales: Fr34 billion. Activities: Defense systems—56 percent, Aeronautical equipment—28 percent, Services and data processing—12 percent, Miscellaneous—4 percent

Thomson-CSF in turn owns 24 percent of SGS-Thomson (semiconductors); sales: Fr12 billion.

The digital revolution is shattering the barriers between the civil and military sectors. It is on these technologies that Alain Gomez relies to shape the future face of the Thomson group.

#### France: Pact Links Ideacod-Hohner Automation, BEI Motion Systems

94WS0478A Paris L'USINE NOUVELLE in French  
21 Jul 94 p 16

[Article by Michele Herzberg: "French and American Encoders Work Together on Rotatable Optronic Sensors"]

[Text] Two enterprises—one French, the other American—specializing in sensors have decided to join forces to widen their market and pool their technological research capabilities.

Ideacod-Hohner Automation [IHA], headquartered in Strasbourg, and California's BEI Motion Systems Company, both makers of optical-electronic [i.e. optronic]

sensors, have just concluded reciprocal accords guaranteeing each an exclusive distributorship for the other's products.

BEI will be responsible for commercial cultivation of the zone comprising the United States, Canada, and Mexico. Ideacod-Hohner Automation will cover Europe.

IHA already has a solid commercial network in Europe.

"We have 12 million French francs [Fr] of export sales in Europe," says Michel Ehrhart, the company's CEO, "and our objective for 1994 is Fr14 million."

The Alsatian enterprise opted for an American development partner primarily in order to stimulate exports:

"In our domain, mergers and partnerships aimed at reaching critical mass [in terms of market] have been forming in the United States since 1984-1985. Europe is just now beginning to stir... We have chosen an American partner instead of a European to widen our market."

BEI, which was looking for an ally in the Rhine basin, had similar concerns.

But the Franco-American partnership goes further. "We could easily triple the production area at our existing plants." The possibility of building a facility in Strasbourg for manufacture of new products is also being studied. For the last 6 to 7 years, IHA has been investing 10 percent of turnover in R&D, and this has borne fruit in the form of twenty or so new products. In late 1993, a new generation of sensors (recessed-axis sensors) was put on the market.

From now on, BEI and IHA will share the R&D burden. IHA will continue its research in the specific technological domains of unbreakable coded "polyfuss" disks and extreme-environment industrial sensors, along with its work on recessed-axis sensor technology.

In California, efforts will continue on silicon chips manufactured by BEI for the two partners. New products based on a new physical principle (still in the domain of position-measuring sensors) will be introduced as early as September.

[box, p 16]

#### Partners Profiled

Ideacod-Hohner Automation produces and sells encoders used on all sorts of automation equipment in diverse industrial sectors: packaging, materials handling, conditioning (25 percent), machining, printing, weighing, robotics, machine-tools (20 percent), automotive engineering (PSA, Renault), and major state-owned enterprises (EdF [French Electric Power Company], SNCF [French National Railroads], CEA [Atomic Energy Commission] (20 percent), engine manufacturers (15 percent, etc.). Turnover for 1993 was Fr32 million, of which 10 percent went to research and development. The target figure for 1994 is Fr38 million. The enterprise has 55 employees, including about ten engaged in R&D.

BEI Sensors and Motion Systems Company is a subsidiary of BEI Electronics Inc., a San Francisco-based holding company. A producer of sensors and adjunct components for precision machining and monitoring in industrial,



military, and aerospace applications, BEI designs, manufactures, and sells incremental and absolute encoders, modular encoders, optical resolvers, speed indicators, speed controllers, brushless motors, and magnetic devices. Its 1993 turnover was Fr800 million, and it devotes \$6 million per year to research and development. As of October 1993, it had 1,341 employees, including 179 working in R&D. [end box]

[box, p 16]

#### IHA's Bubble Memory

IHA in July 1992 committed itself to development of a sensor to meet specifications set forth by the Industry Ministry in its "Factory of the Future" call for tenders. This new product is based on a IHA patent. Development of one specific component has been commissioned to the French company Sagem. This is a counting device called "bubble memory" that operates without an electrical power source. After 2 years of joint research and development, IHA and Sagem last June introduced the prototype of this new angular-position sensor. It is the first entirely electronic sensor that does not depend on electrical back-up power and therefore can operate with unlimited autonomy. [end box]

#### France: Northern Telecom Increases Matra Communication Shares

94P60329A Paris LE MONDE 26 Jul 94 p 29

[Article by C.M.: "Northern Telecom's Participation in Matra Communication Will Reach 50 Percent"]

[Text] Canada's Northern Telecom, a 20-percent capital holder in Jean-Luc Lagardere's Matra Communication telecommunications subsidiary since July 1992, will increase its participation to 50 percent sometime in 1995, as this was made public in the two groups' joint communique on this weekend's eve. This operation should allow the Lagardere group to reduce its debt by 1 billion francs. Lagardere Groupe, which today controls 70 percent of Matra Communication, will lower this to 50 percent, while Germany's AEG Telefunken would cede its 10 percent to the Canadian group.

As a result of this operation, Northern Telecom and Lagardere Groupe will hold all Matra Communication shares divided equally. The two groups will file a public share redemption offer [OPR] as Matra Communication share holders, to be followed by the mandatory redemption procedure.

Jean-Luc Lagardere's group is visibly counting on the Canadian firm's support at reinforcing its position in cellular telephone systems and at facing the enormous development expenses imposed by the booming radio communications. So, Northern Telecom must equally subscribe to capital augmentation at Nortel Matra Cellular, a joint association specialized in GSM [Global System for Mobile Telecommunications] network equipment and infrastructure created in 1992. "Without contesting the workers' management participation in this association," this operation should permit "the firm to recruit more than 150 engineers at its headquarters in Bois-d'Arcy," as the communique indicated.

#### French-German Missile, Satellite Merger Proceeds

BR1708114094 Paris LA TRIBUNE DESFOSSSES  
in French 16 Aug 94 p 7

[Olivier Provost report: "A French-German Alliance Where The Keynote Is Parity"]

[Text] The marriage of Aerospatiale and DASA (German Aerospace, a member of the Daimler-Benz group) in both tactical missiles and satellites is now in its final phase. Of course, in the space sector, account must also be taken of Alcatel. However, Alcatel could be associated in the sector of telecommunications satellites without jeopardizing the union of Aerospatiale and DASA—especially since, for both companies, it is necessary for the alliance in satellites and missiles to advance in harmony. According to a source close to the matter, the fusion of the two companies is almost complete. All that remains to be done is to settle how exactly the respective assets will be assessed. The structure chosen is Germanic in style, with a supervisory council and a board of directors led by a chairman and co-chairman, with both signatures needed for strategic decisions. In missiles, where Aerospatiale plays a leadership role that its German partner does not contest, DASA will probably lead the supervisory council and act as co-chairman of the board of directors. The French firm will provide the chairmanship of the board of directors, i.e., the operational authority. The headquarters will probably be located in France, most certainly at Aerospatiale's tactical missiles headquarters in Chatillon, near Paris.

The opposite plan will be seen in satellites, where DASA has big ambitions: DASA will chair the board of directors and will undoubtedly have its headquarters near Munich. Aerospatiale will act as co-chairman of the board of directors and as chairman of the supervisory council. However, the capital of the two joint companies (satellites and missiles) will be split 50-50. This is what the French public authorities wanted. Indeed, they rejected DASA's proposal for a 51-49 split for DASA in satellites. Paris vetoed a minority holding in this sector. Consequently, parity is the order of the day, but to compensate for the differences in size, the principle of a key for allocating and increasing dividends seems to have been retained. This is to the French group's advantage in tactical missiles, even if DASA brings to Aerospatiale its cooperation with the Americans which it needed (for Stinger, Patriot, and Hawk missiles), good profitability, and easy access to the German market. However, for satellites, the distribution is still under negotiation. The Germans, who feel that they are more important than their partner in this sector, want the majority of the dividends. Aerospatiale contests this opinion, feeling that it has invested a lot in the products of the future and in research. It is therefore asking for this non-material asset to be assessed at its proper value. The exact assessment of the contributions made by both parties, in both the missile and satellite sectors, is currently under way. This assessment should make it possible to make a decision.

In any case, the duo must not waste any more time. The solidity and credibility of this twofold strategic marriage is at stake. The duo originally wanted to have finalized the

matter, especially in the satellite sector, by this past 1 July. This would have left the European Commission's directorate responsible for competition policy its traditional five months to decide whether or not to give the go-ahead for the merger, meaning that the joint company could get going on 1 January 1995. Now, however, it will be very difficult to stick to this timetable.

#### Satellites: Alcatel Invited to Negotiations

There was a surprise in the process of the expected creation of a joint company in the satellite sector between Aerospatiale and DASA. The matter seemed to be taking more time than planned anyway, and a new factor has just come into the picture to complicate things: Alcatel Espace (of the Alcatel Alsthom group) has finally been invited by Aerospatiale to the talks in the name of their long history of cooperation in satellites, according to sources close to Alcatel. Other sources say, however, that the guest had to crash the party. Indeed, Aerospatiale and DASA were right to get married, but they are both at the same time members of the four-way "alliance" comprising Alcatel Espace and the Italian company Alenia, among others. It also holds 49 percent of Loral Space Systems (formerly Ford Aerospace), the satellite subsidiary of the U.S. company Loral. Within this "alliance" there is a code of good conduct: allocation of tasks and responsibilities in accordance with skills, markets, and contracts; exchange information with partners; and partnerships in those areas where it is possible and desired. With regard to the marriage between Aerospatiale and DASA, Alcatel is said to have had the impression that it was not given its say. Hence the three-way talks now being held. This information has been confirmed by an industrial source and by the public authorities, which feel that the principle is "rather sensible."

It is true that Aerospatiale and Alcatel have been working together in this sector of the space industry for many years. The former has specialized in satellite platforms with its Spacebus products and therefore has the status of prime contractor. The latter has become the specialist in payloads, which can account for up to 70 percent of the total cost of the satellite. Hence Alcatel's ambition to be recognized as a prime contractor, or at least as a co-prime contractor. This desire was recently manifested again with the 66th launch of the Ariane rocket last week, which put into orbit the Turksat satellite. Aerospatiale was the prime contractor, but Alcatel Espace said that it was co-prime contractor before changing its line by acknowledging that it was "only" the prime contractor for the payload. Is this just a trifle? Indeed, in the recent past, Alcatel went so far as to propose to buy Aerospatiale's space center in Cannes, the only one in France (in addition to the Matra center in Toulouse), so as to enable it to build completely integrated satellites. "It was a question of knowing whether we wanted to get out of satellite activity," an Aerospatiale leader summed up ironically.

As a logical association in everyone's eyes, and something which has also been studied on several occasions—in particular more than a year ago—this association of two French companies is therefore continuing to run into problems of quite different levels of sensitivity and corporate culture. Thus, the Alcatel Espace leadership only wanted to negotiate a rapprochement on a 51-49 basis to

their advantage. This logic of leadership allegedly was imposed by the CEO of the Alcatel Alsthom group, Pierre Suard himself. This is inconceivable for Aerospatiale. However, Aerospatiale gives Alcatel Espace an undoubted domination in the area of telecommunications satellites and their payload. The idea is therefore making the rounds of an Aerospatiale-DASA duo in a 50-50 company in the satellite sector, with an extension into telecommunications activities where Alcatel Espace would be present or could have a majority holding. This is enough to satisfy the ambitions of Alcatel Espace without giving it the leadership of the whole. It remains to be seen whether the three partners plan will prefer this plan. What will the fourth member of the alliance, Alenia, do? Because it is Alenia that would move heaven and earth not to be kept out. It would modestly propose to only have a minor role and holding in the joint company, in accordance with its influence in the space sector. However, this risks complicating the process even further, especially since some on the French side fear seeing the Italians end up turning to the Americans, like they have already done in other aeronautics activities (airplanes and helicopters).

An alliance with two, three, or four partners will go hand in hand with restructuring, in any case. In the satellites sector, Aerospatiale has one site, Alcatel Espace has one or even two, and DASA also has two—not to mention Alenia. The Americans, however, have already massively restructured their satellite industry and Matra Marconi Space—the alliance's European rival, a 51-49 merger of Matra (Lagardiere group) and GEC Marconi in the space sector—has recently taken over British Aerospace Space Systems.

#### Thomson-CSF, Thorn EMI Defense Link-Up

BR0408092094 Paris AIR & COSMOS/AVIATION  
INTERNATIONAL in French 4 Jul 94 p 11

[Report by Jean Dupont: "Thomson-CSF Reinforces Its Presence in Britain"]

[Text] Thomson-CSF has just signed an agreement in principle with Thorn-EMI (UK), taking over its activities in missile electronics and optronics. Both these divisions employ nearly 1,000 people. The deal will reinforce the longstanding links between both industries which had already worked in partnership on a number of European programs, notably the Cobra counter-battery radar, the MLRS [Multiple-Launch Rocket System] Phase 3 rockets and Trigat anti-tank missiles.

Thorn-EMI has a turnover of 550 million French francs (Fr) in missile electronics, which will be added to CSF's Fr400 million turnover in its missile electronics division. The French group now ranks number one in Europe, holding 8 to 10 percent of the world market in front of other French groups SAT (SAGEM group) and Dassault Electronics.

The technologies of both partners in proximity rockets for missiles are complementary. Thomson-CSF specialized in electromagnetic sensors for the Crotal missiles as well as for those developed by Matra (Super 530, Magic 2, Mica). Thorn EMI supplies laser proximity rockets for British Aerospace's Rapier, ASRAAM, Sky Flash and Seawolf. The management at Thomson-CSF emphasizes its move is

complementary to the association now taking place between Matra and British Aerospace in the field of missiles.

In optronics, Thomson-CSF is reinforcing its position as number one in Europe and number three in the world, way behind Hughes (Fr5 billion) and Martin Marietta (Fr4.5 billion). The group's total activity in optronics is worth Fr2.4 billion, in addition to that of Thomson-TRT Defense (Fr1.3 billion), Pilkington Optronics (Fr800 million), the object of a 50-percent buy-out in 1991, and Thorn EMI (Fr250 million). The latter was selected by the British defense ministry to produce UK Class 1 thermal imagers, which are the basis of military infrared viewing systems in the United Kingdom. It also supplies the British Army with large quantities of Multi-Role Thermal Imager cameras. Finally, Thomson-CSF is involved in the Eurofighter 2000 in which Thorn EMI is developing theIRST infrared sensor system under the supervision of the Italian firm Fiar.

Thomson-CSF is moving steadily towards a critical size and the French group has taken control of an additional Fr15 billion since 1989. Other than buying Philips' subsidiaries (HSA in Holland and TRT in France), most of its acquisitions (Link-Miles, MEL, Rediffusion) and its creation of joint ventures (with Shorts and Ferranti) have taken place in Great Britain. Its presence there was reconfirmed recently with the signing of an agreement in principle involving the purchase of Ferranti International's industrial systems division, which is currently in receivership. This division works in the field of large controlling systems for water and energy distribution networks. It is to be noted that Thomson-CSF has made no significant move to set up in Germany, the third largest European defense market.

#### **Cooperation Agreement Between Thomson Brandt Weapons and NFT**

Thomson Brandt Armaments (TBA) and the Norwegian NFT [Norsk Forvars Teknologi] signed a cooperation agreement during the Eurosatory Fair in the field of proximity rockets and firing computers for mortars. According to the terms of this industrial and trade agreement, TBA will be able to complete its range of triggering devices with NFT's proximity rockets for 81 mm and 120 mm mortars and will also open up markets for its products in Scandinavian countries. NFT will benefit from the French trading bases, whose mortars equip the armies of 21 different countries.

Both industries plan to jointly produce electronic components for their weapons. TBA employed a staff of 900 for a turnover of Fr1.3 billion in 1993. NFT realized sales figures of Fr1.7 billion last year and employs 1,600 people.

#### **Germany: Valeo, Siemens Plan Manufacturing Agreement**

94P60339A Paris LE MONDE in French 29 Jul 94 p 22

[Article by A.K.: "Valeo and Siemens Plan to Merge Some of Their Activities"]

[Text] Valeo, an automotive supplier firm, and the Siemens Company plan to merge their vehicle air conditioning activities. The project is sufficiently mature to have become the object of a communique made by the

French-Italian group (Cerus of De Benedetti group owns 35 percent of Valeo) on 27 July. According to the text, "The study's conclusion should come by the end of 1994."

The merger could take the shape of two holdings. In the first—air conditioning systems—the majority of shares will be Valeo's, whose development activities have for many years concentrated in this area. This holding's annual turnover will come to around four billion French francs [Fr], three billion coming from Valeo and one from its partner. The second holding—where the majority of shares will be Siemens'—will be dedicated to manufacturing small electric motors used in air conditioning systems. The German company's share in the holding's projected Fr2.6-billion yearly turnover comes to Fr2.4 billion.

#### **Industrial complementarity.**

For the companies involved, this alliance project appears interesting for two reasons. They are in effect complementary to each other industrially, as well as geographically. An agreement with Siemens should open wide before Valeo the traditionally shut gates of the German automobile market. Moreover, this partnership happens in one of Europe's expanding (industrial) segments. Presently, on the Old Continent only 15 percent of automobiles are air-conditioned compared with North America's and Japan's 90 percent.

### **CORPORATE STRATEGIES**

#### **Germany: DASA Head On Major Aerospace Industry Issues**

94WS0470A Duesseldorf HANDELSBLATT in German 25 Jul 94 p 15

[Talk with Deutsche Aerospace Head Jurgen E. Schrempp by Wieland Schmitz and Waldemar Schaefer: "I Am Uneasy With the Dollar at 1.50 Marks"]

[Text] In Bonn the aerospace industry is again getting respect, the armaments industry has passed the slump. Still, DASA [German Aerospace Company] director Jurgen Schrempp complains about nevertheless "rudimentary" support for aeronautics.

"Our politicians now have the right to decide for or against international deployment of the army, but they can also no longer say, we're sorry, the Constitution doesn't allow it." The most recent decision by the Federal Constitutional Court on UN deployment of the [German] army also means for Jurgen Schrempp, Member of the Executive Board at Daimler Benz and head of German Aerospace AG, "that we have come of age." It is, however, also "absolutely proper that the Parliament will decide on deployment of our strike forces by majority [vote]."

The decision naturally affects the designated successor to Daimler head Edzard Reuter not only as a citizen but especially as the head of the largest European aerospace and armaments group DASA: "Now Bonn must give more intensive consideration to what armaments the army needs: for example, for transport into areas of operations."

And consideration must first of all be given here to the possibilities for transport and thus to the successor to the old Transall Transporter, the (not yet officially begun)



**FLA (Future Large Aircraft.)** This project, in which Spain and Italy are also involved along with Germany and France, would contribute substantially to the full utilization of the development and later the production capacities of DASA.

#### **Equipment for Deployment on Behalf of the UN**

Since the project was given a positive assessment at the top-level talks between Helmut Kohl and Francois Mitterrand a few weeks ago, attempts are now being made to also get England to participate in order to achieve the greatest unit quantity [of equipment]. London, however, still intends for the time being to remain as they are with the procurement of American aircraft. If no change occurs here, it would have consequences for the manufacturer, British Aerospace, "which naturally can participate in the FLA only if the British also purchase the aircraft," Schrempp emphasizes.

With the FLA, DASA and the French industrial partner Aerospatiale want to take for the first time a completely new direction in military procurement: instead of detailed specifications and tight controls, the industry is only to be given goals or targets of what the aircraft must be able to do: "We will then say what the aircraft will look like, and then will give a firm price—at our risk." If the European fighter aircraft (EFA) had been produced according to a "commercial concept" like this, it "would certainly have been substantially cheaper," in Schrempp's opinion.

Since as many civilian components from the Airbus program as possible are supposed to be used in the FLA, it could also be built within the framework of the Airbus co-production. Schrempp is proposing—in case Britain does take part—the formation of a subsidiary company of Airbus Industrie (Toulouse), in which Aerospatiale, German Aerospace, British Aerospace and Casa (Spain) already belong as partners. The Italian Alenia would be another partner of the new subsidiary.

This would also be one way for Schrempp to drive forward the pursued Italian integration into co-production in European aircraft. "They can no longer join Airbus Industrie as partners, [since] that would be too expensive for Alenia because of the high past expenses on the part of the partners up to now—but as a partner of Airbus subsidiaries." Something like that could also develop and build the future 500- to 800-seater, [an effort] in which additional partners, particularly the Russians, will have to join. Not last of all to open up new markets and to be able to handle larger unit quantities in production.

Schrempp's efforts with Alenia have become particularly urgent, since the Italian group is carrying out negotiations on co-production with the U.S. manufacturer McDonnell Douglas. If the Italians break ranks with the European aerospace group, it could endanger some of Schrempp's plans: Alenia works with Aerospatiale in the ATR Consortium for propeller planes—where DASA wants to bring in over the long term the aircraft activities of Dornier. In addition, the plan is for Alenia to participate with Aerospatiale and British Aerospace in the DASA subsidiary Fokker.

What constellation [of participants] will produce a future large-scale aircraft with 500 to 800 seats is still completely open, according to the head of DASA. Currently, Airbus developers are working on a project (A3XX) as are experts from Boeing, who are at the same time also pursuing an idea for a larger Boeing jumbo jet.

In addition, there is the joint feasibility study by the Airbus partners and their arch rival Boeing, a study initiated by Schrempp which is in part controversial in Europe. Schrempp intended to use this to expand the options for the Europeans: "If a large-scale airplane is being built, the Americans will in any case be part of it—the question now is whether they do it with the Japanese and against the Europeans or whether we are able to participate."

#### **Feasibility Studies Also With Boeing**

In July 1995, the teams are to make their presentations and then the pivotal question will be asked. Schrempp is convinced that with development costs running to 10 to 15 billion dollars, the predicted sales of 300 to 500 large-scale airplanes within 20 years will only allow for one supplier world-wide.

A new aircraft project beyond the Airbus family will in any case throw open the question of federal support for aircraft construction. A European agreement with the Americans limits the direct (repayable) funding to 33 percent of the costs of development, while previously it was up to 90 percent.

At the same time, it permits indirect support via federal programs for technology which may not exceed 3 percent of civilian aircraft sales. Still, Bonn has thus far only made one side of the agreement a reality. Schrempp: "We already have the reduction to 33 percent for direct funding; the indirect funding, however, I can label as rudimentary at best."

The recently adopted technology program of an annual 150 million German marks [DM] for the aviation industry over a 5-year period—to which industry must contribute an equal amount—is according to Schrempp "a move in the right direction," but only by "a millimeter." Only DM50 million will reach the industry. In view of the Americans with their massive indirect support which is about 17 times as great, the technology program, even with the addition of all European funding, would be far from being enough for a new aircraft program. It can only be a beginning.

But Schrempp sees the program as "qualitatively" very positive. "We are not concerned first and foremost with the amount of the contribution, we are concerned with the perspective: Is the strategic importance of this industry acknowledged, is it recognized that results in technology are also important for people and that it is a political industry and will remain so?"

In this respect, something "almost unbelievable has happened" already: presidents of the ministries have gotten together with the Chancellor to talk about the future of the industry, and encouraging words were spoken regarding the ILA [International Aeronautics Exposition] aeronautics exposition in Berlin, while as recently as the fall of last year the aeronautics industry played no roll whatsoever in the federal government's position security report.

Schrempp generally traces this turnaround in thinking back to the spectacular DASA decision not to participate for the first time as an exhibitor at the ILA in 1994. "With that, we made it clear: If Germany does not need this industry, then we also do not see why we should attend at enormous cost a German aeronautics exposition."

Schrempp is speaking up for a new concept of the ILA anyway: "It is a waste of resources if we have three major aeronautics expositions in Europe within two years, Le Bourget, Farnborough and Berlin," with Berlin and Farnborough taking place very close to the same time.

#### **The ILA Should Show Technologies for People**

The ILA needs a new image. This could be that in addition to the products of the industry, "we work out technologies which will be important for people's needs in the next millennium. For example, regenerative energy production, environmental technology and traffic control engineering." This could significantly improve public acceptance of the industry.

If federal support has an influence on the future prospects of DASA, so does public awarding of contracts directly determine business in armaments and aviation. This dependence has in the meantime fallen to the historically low level of 34 percent of the group's turnover (DM18.6 billion), of which armaments alone make up 26 percent, where it had previously reached 50 percent.

The decrease was an involuntary consequence of the cut in military contracts by half and of the tighter aerospace budget. But Schrempp is making a virtue of necessity: "I would in any case have seen it as my task to reduce dependency on government contracts. And we have always wanted to reach a 25-percent share in armaments." This direction is to be continued in aerospace with the build-up of commercially run businesses and satellite supported communications.

In defense technology, Schrempp thinks that the low point in awarding contracts has been reached. "All major parties say that the share of investment in the defense budget has to be raised from the current 19 percent back to 25 percent." The constitutional decision could also have an effect here, and DASA is active in all areas which are important with respect to possible distant deployment of the army, [areas] such as transport, air defense, ground-air defense and electronics.

With joint ventures lined up with Thomson for rocket operating systems and missile mechanisms, with Aerospatiale for guided weapons, and possibly with Siemens in electronics, Schrempp sees "a very good foundation for our defense technology." He is also still "firmly convinced" that the EFA fighter aircraft will be produced.

This conviction also gives him more reason to expect that DASA will soon be in better financial shape than it is today. In addition to the at least stable demand for armaments, he expects a recovery in the aircraft business because of the pent-up demand on the part of the airlines for replacements.

The drastic remedy of eliminating of 16,000 jobs by 1996 and closing or spinning off six locations is yielding an "effective basic" savings of DM2.5 billion annually which will be fully realized in 1996. However, he expects to be in the black already by 1995, as announced.

#### **The Dresden and Speyer Sites Remain**

"Even if the miserable status quo continues in the industry, which I do not believe [will happen], I am relatively certain that we will achieve that." From the viewpoint of pure business economics, however, two additional locations must still be closed: Dresden and Speyer. Yet Schrempp intends to hold on to Dresden out of "social and societal-political responsibility." Speyer is "problematical, but we'll manage it."

The exchange rate with the dollar could thwart future DASA earnings: "I feel uneasy when I see the dollar at DM1.52," Schrempp says referring to the high backlog of orders at Airbus which were invoiced in dollars but whose value must be calculated in German marks for the balance sheet. "We will make a profit this year at German Airbus GmbH in spite of the weak dollar, but with a low dollar exchange rate, even on the cut-off date, that will be opposed by substantial impending loss reserves."

#### **Photo Caption**

Portrait: Juergen Schrempp joined Daimler Benz in 1967. Since 1989, he has been the head of the German Aerospace AG and a full member of the board of the consolidated companies. Schrempp was particularly successful as president of the U.S. affiliate Euclid and as CEO of Mercedes Benz of South Africa. In May of 1995, he is supposed to take over as CEO of Daimler Benz AG. Photo: Rabanus

#### **France: Bull, IBM Mainframe Market Performance Compared**

94WS0466A Paris 01 INFORMATIQUE in French  
1 Jul 94 p 17

[Article by Pascale Lecerf: "The Price Gap Between Bull and IBM Widens"; first paragraph is 01 INFORMATIQUE introduction]

[Text] Cube's GCOS-8 group has published a study comparing the prices of big IBM and Bull systems. Bull is much more expensive at the top of the line. Even that observation, however, must be tempered by another, namely the fact that the pricing policies of the two manufacturers are becoming difficult to track.

"This cost comparison is purely passive—it simply notes the facts," cautiously explains Rene Teilhet, the head of the cost comparison group that conducted Cube's (Bull's user group) new study. The study sought to measure the

selling prices of big Bull GCOS-8 systems against their IBM counterparts under MVS. "Users will draw their own conclusions."

The 1994 report compares only three configurations, down one from previous years. The first features power of 125 tps (transactions per second), 500 connected terminals, and storage capacity of 50 GB. Bull's offering in that category is the DPS 9000-542-1; IBM's is the ES/9000-511. The second configuration boasts 300 tps, 1,500 terminals, and 100 GB of memory, a combination that is provided by Big Blue's ES/9000/9121-732 and Bull's DPS 9000-554-1. The last category is represented by the ES/9000/9021-821 or 740 and the DPS 9000-991, which offer capacity of 500 tps, 2,000 terminals, and 130 GB. The 25 tps configuration was deemed unrepresentative of today's market.

But the backdrop of the comparative study has changed since 1992. Indeed, IBM has not put out a catalog for two years. Cube's working group had to rely on estimates made by the Gartner Group, whose financial department vice-president, Glenn Cuthbertson, describes estimations as "based on a study of prices actually paid by customers for current big systems, plus an estimate of what additional functions offered by the new lines would cost." Although the working group notes that "catalog prices have lost their meaning, and we do not know exactly what price rebates were in effect," it nonetheless used catalog prices for Bull products. Comparisons were not made on complete systems, but on four components: the mainframe, central software (operating system, network management, disk and file managers), storage peripherals, and mainframe maintenance costs.

#### A 20-Percent Difference on Magnetic Disks

Consequently, study results must be taken with a grain of salt. IBM's mainframes are cheaper than Bull's, and the higher up the line you go, the greater the gap. For a 500-tps configuration, the catalog cost of the Bull machine is 66 million French francs (Fr), compared to an estimated IBM price of Fr28 million. The Cube working group wonders whether "Bull could offer a price rebate for a DPS 9000-991 to keep it at Fr35 million or below." Bertrand Ratouis, the head of big systems marketing, replies that "mainframes are not the only important component of a big system. Our financial engineering policy keeps us competitive." "Financial engineering" at Bull consists, among other things, of offering to buy back old machines. A comparison of second-hand Bull DPS 90-92T and IBM 3090-28J/T machines shows identical costs. Analysis is even trickier for magnetic disks, since the comparison was made on IBM-compatible systems and turned up a 20-percent gap. On the other hand, system software and maintenance costs, evaluated for a four-year period, tip the balance in favor of GCOS-8 systems. "This is an important point: We are cheaper when both side's catalog prices are used as the point of comparison," notes Bertrand Ratouis, head of big systems marketing at Bull.

The working group concludes by advising buyers to mull over the data and keep in mind such limitations as the difficulty of getting a handle on the real prices of big systems. It believes an assessment of batch processing

would have favored IBM. Indeed, a transactional assessment shows that 1,000 load units (Bull) roughly equates to 2 Mips (IBM). When batch-processed, the same 1,000 load units come to only about 1.5 Mips. Another fact worth noting is that IBM-compatible solutions such as Amdahl or Hitachi lower the cost of big IBM systems by 15 percent. Generally speaking, however, other manufacturers (Bull, ICL, Siemens, but also Unisys) charge much higher prices than IBM or compatible makers, notes Glenn Cuthbertson. "These manufacturers were not able to keep up with the price reductions offered by IBM. There are two possible outcomes: either users will migrate toward open systems to avoid the high cost of updates; or they will shift to all-IBM or IBM-compatibles to take advantage of their cheapness and greater standardization."

#### Side-by-Side Comparison of Bull and IBM Configurations

	Bull	IBM
<b>Equipment</b>	<b>DPS 9000-542-1</b>	<b>IBM ES/9000-511</b>
Configuration: 500 terminals, 50 GB	144 tps	128 tps
Cost	Catalog: Fr11 million	Real (est.): Fr7 million
Cost per tps	Fr76,000	Fr55,000
<b>Equipment</b>	<b>DPS 9000-554-1</b>	<b>ES/9000/9121-732</b>
Configuration: 1,500 terminals, 100 GB	344 tps	363 tps
Cost	Catalog: Fr25 million	Est. real: Fr20 million
Cost per tps	Fr75,000	Fr55,000
<b>Equipment</b>	<b>DPS 9000-991</b>	<b>ES/9000/9021-821 or ES/9000/9021-740</b>
Configuration: 2,000 terminals, 130 GB	546 tps	486 or 536 tps
Cost	Catalog: Fr66 million	Est. real: Fr28 million
Cost per tps	Fr121,000	Fr58,000

#### France: Software Engineering Firms' Service Sector Evaluated

94WS0466B Paris LE MONDE INFORMATIQUE  
in French 24 Jun 94 p 60

[Article by Jean-Francois Perret: "Growth Spurt in Software Packages and Information Management in 1993"; first paragraph is LE MONDE INFORMATIQUE introduction]

[Text] After analyzing the 1993 results of French software houses in foreign and all markets (see LE MONDE INFORMATIQUE of 13 May and 3 June 1994), PACI [Pierre Audoin Consultants] looks at trends in different service categories. Intellectual services are down, while sales of software packages and information management are up.

During sluggish 1993, the computer software and services market grew at a rate of just under 3 percent, which is no growth at all when adjusted for inflation. This relative decline highlighted the contrast between intellectual services (consulting, assistance, the production of specific



software, training, systems integration, solutions engineering) and software packages/information management. The first fell in current French francs [Fr], while the last two maintained growth rates near or above 10 percent a year.

#### **Stable Company Rankings in CAP (Consulting, Assistance, and Production) and SI (Systems Integration)**

The market for consulting, technical assistance, and the writing of specific software (CAP) has shrunk about 2 percent, generating a business volume of nearly Fr21 billion. The frontrunners have changed little. Andersen, Unilog, and Sligos (thanks to the takeover of Marben) have pulled ahead at the expense of CISI [International Data Processing Services Company] and CGI [Cap Gemini Innovation], while Cap Sesa's sales have taken a plunge. The sharp drop in technical assistance work has prompted the Cap Sesa group to shift into systems integration.

This means that, as an indicator, the change in CAP sales must be handled with care. Besides the top five, Altran, Alcatel TITN Answare, SG2, and EDS have boosted their sales. Manufacturers IBM and Bull (excluding subsidiaries) do not rank in the top ten.

The definition of systems integration was modified this year (the threshold of business so classified was lowered to Fr2 million, excluding hardware resale), to take technological and structural changes into account. The new definition boosted the SI market to over Fr9 billion in 1993.

Despite these changes, the frontrunner group has remained remarkably stable. Except for Alcatel-ISR, all the companies have increased their sales to varying, though modest, degrees. Indeed, growth in invoices—and especially order books—has slowed considerably for this market. Turnover grew only 4 percent in 1993 (against 10 percent in 1992). Another noteworthy factor, which does not show up in our table, is the offensive mounted by “non-software engineering firm” service providers, since firms such as IBM or Cegelec are not too far from 5th place. Moreover, CGI and Euriware have moved up at the expense of Alcatel TITN Answare and EDS France.

The solutions engineering market (which involves installing standardized management solutions on small and PC systems) declined sharply in 1993 (-3 percent) to about Fr7 billion. Here again, the group of leaders is stable with CCMX and Cegid in the small business accounting-management market; GSI supplying solutions for industry and commerce, auto dealers, and transport companies; Telesystemes working the local community and logistical-engineering-solutions niche; and Finifor in the AS/400 and PC markets.

#### **Software Packages: Mighty Microsoft**

The market for bundled software grew to Fr20 billion, up 9 percent. It will shortly (1995?) become the top big market in terms of volume, inching out “CAP.” Here too, there are few changes in the leadership ranking. Behind the always-to-be-reckoned-with Microsoft, which is widening the gap between it and other companies, are the two American firms Computer Associates France (which could rack up

nearly Fr1 billion in 1994, with its purchase of the Ask-Ingres group) and Oracle. CGI and Sopra are the only software-engineering firms able to hold on, with “in France” sales of Fr500 million.

Restructuring within the IBM group could boost CGI into the club by 1994. The other highlight of the year is the decline or stagnation of French sales racked up by CAD (Computer-Aided Design) champions Dassault Systemes, Matra Datavision, and Cisigraph, which had become used to big increases in the past. Finally, companies that grabbed bigger market shares include Saari, Top Log, and emerging firms such as Business Objects or Systar, whose sales in France will soon hit Fr100 million.

#### **Information Management and the Axone Phenomenon**

In contrast, the final market segment of “processing, information management, and value-added services” is changing radically, as Axone closes in on or passes up traditional processing and information management players (Axime, GSI, Sligos, EDS). The takeover of IBM's in-house data processing, combined with a strong surge in the open market, has practically tripled Axone's turnover. Euriware has cracked the top ten, propelled by its FM (facilities management) contracts with the Cogema group. CGS and Cegedim have also graduated into the Top, while Telesystemes, SG2, and Inforsud lost ground. The processing, IM, and value-added services market amounted to more than Fr14 billion in 1993 (including nearly half for information management), and the information management market alone appeared to grow over 25 percent (a record!).

The first months of 1994 have seen a tentative improvement in the business climate for data-processing services. But the “profits” to be made from this gain seem to be unequally distributed. Upward shifts in the rankings and increased market shares can also be predicted in 1994, on the basis of already-announced strategic changes:

- EDS France's acquisition of Eurosept;
- the rise of Syseca's information management business with Thomson;
- Bull's takeover of Bull-Ingenierie and the emergence of Athesa.

And, after two tough years, Cap Sesa will very likely see some growth again.

#### **1993 Ranking of French Software Engineering Firms by Type of Service**

Rank	Company	1993 Sales in FrMillions
<b>Consulting, Assistance, and Production</b>		
1	Cap Gemini Sogeti	1,630
2	Andersen Consulting	564
3	Sligos	549
4	Unilog	540
5	CGI	520

**1993 Ranking of French Software Engineering Firms by Type of Service (Continued)**

Rank	Company	1993 Sales in FrMillions
<b>Systems Integration</b>		
1	Cap Gemini Sogeti	1,150
2	Sema Group	894
3	Sysec	709
4	Steria	438
5	Alcatel ISR	315
<b>Processing and Facilities Management</b>		
1	Axime	1,399
2	Axone	1,200
3	GSI	1,080
4	Sligos	1,054
5	EDS France	1,002
<b>Software Packages</b>		
1	Microsoft France	1,650
2	Computer Associates	642
3	Oracle	438
4	CGI	364
5	Sopra	343
<b>Solutions</b>		
1	CCMX	584
2	Cegid	286
3	GSI	275
4	Telesystemes	229
5	Finifor	216

Source: PAC-LMI

**Footnote**

1. In advance of the first publication, starting in July, 1994, of its annual study entitled "Software Engineering Firms 98, the Outlook for Software and Information-Processing Services in France."

**France: Bull Reports Improved Performance**

94WS0466C Paris 01 INFORMATIQUE in French  
1 Jul 94 p 6

[Text] As part of a deliberate public relations campaign, Bull has just announced increased sales over the last five months, new agreements with its shareholder France Telecom, and a decision to open up its board of directors to customers. The manufacturer says its business volume grew 14 percent more between January and late May than it did the year before, and that its operating costs have dropped 16 percent. The move to reduce non-salary expenses—one of the centerpieces of Jean-Marie Descarpentries's strategy to prepare for privatization—will force

Bull staff to leave La Defense headquarters for Louveciennes. The CFDT [French Democratic Confederation of Labor] has roundly criticized the transfer, pointing out that Bull will have to pay 138 million French francs in rent a year for five years because no new tenant has stepped forward. Besides announcing new contracts, Bull has given notice that it has finalized agreements with France Telecom, which will manage the manufacturer's private international network and use the ISM [Integrated System Management] software. Finally, Bull has added new members to its board of directors, including three representative of customers (EDF [Electricite de France—French power company], Publicis, and Compagnie de Suez).

**Airbus Plans New Versions Derived from Current Models**

94WS0450A Paris AIR & COSMOS/AVIATION  
INTERNATIONAL in French 11-24 Jul 94 p 17

[Article: "Airbus Researches A340 Able to Circle Globe in 20 Hours"]

[Text] Airbus Industrie is preparing about 10 new versions derived from the current Airbus family, not counting the possible Super-Jumbo A3XX (Cf. A&C nr. 1476). Adam Brown, assistant general director in charge of strategic planning at Airbus, unveiled them last month at a technical seminar. The projects entail:

- an A319 with extended radius exceeding 5,000 NM [nautical miles] (9,300 km). Intended for transamerican routes, the craft would be equipped with underbelly tanks and would have a takeoff weight totaling 64-68 t [tons].
- an A319 "VIP" ["Very Important Person"] appointed as a luxury craft having only 30 seats (instead of 124). Derived from the above, the aircraft would link Europe to the Mideast non-stop or make transatlantic flights. The project should begin quite soon so as to help jumpstart A319 sales.
- an extended (by 50 percent) radius A321 going from 4,300 to 6,600 km, by means of minor modifications of the aircraft and improvement in the CFM56B or V2530-A5 engines. Airbus is preparing a financing plan for the project for an aircraft serving transcontinental routes in Europe or to the U.S.
- an A330-300 having increased radius and shortened (by 14 sections) fuselage for 240 passengers in three classes over the same distance as the B767-300 ER (+11,000 km). But the project is being reanalyzed, since the large wingspan (60 m [meters]) limits the aircraft's access to some airports.
- a stretched A330 having 50 extra passengers (total of 385) and enhanced payload of 20 t (63-68 t) over the same distance as the A330 (9,000 km).
- a super stretched A330 having a new underbelly cabin forward of the wing for a "large capacity" arrangement holding a total of 440 passengers like the B747, but more economical and over shorter routes than the A340. The project has been christened A330-500.

- a stretched A340-300 having an additional 50 seats with a range equal to or greater than that of the A340-300.
- a super long radius A340 equipped with enhanced thrust engines and increased weight vis-a-vis the A340-200 of 257 t. This A340-8000 would be rigged to carry 260 passengers in three classes over 8,000 NM (14,800 km) in 17 hours and 30 minutes of flying time. It could be on-line as of 1997.
- an A340-8500 having an even greater radius (entailing more fuel) and attaining 8,500 NM (15,700 km). It would be the first Airbus—and commercial aircraft—capable of linking Europe to Australia non-stop—in 18 hours and 30 minutes of flying time, but holding only 140 passengers. It would have underbelly tanks and beds under the cabin for first-class passengers.
- a super long radius A340-200 is also on the drawing board for Airbus to circle the globe in 20 hours with a single layover!

Those new versions will have a takeoff weight of approximately 300 t instead of the A340's 257-271 t. All the A340 enhanced versions require a new turboblower engine having 40,000 pounds (18 t) of thrust that still does not exist. But Airbus has already started consulting with all the major engine manufacturers—CFM, GE [General Electric], P&W [Pratt & Whitney], IAE [International Aero Engines], Rolls-Royce—who have "all responded with enthusiasm," states Adam Brown.

The most innovative project is P&W's that proposes an "Advanced Ducted Propulsor" (ADP): a composite-material turboprop with an extremely high dilution rate and for which a demonstration model is currently undergoing testing. Such an engine could reduce consumption by 10 percent compared to the A340's CFM56-5C. CFM, in turn, has proposed either one with increased thrust derived from the CFM56-5 or a new CFM-XX engine. Rolls-Royce for its part is proposing the new RB-411.

### France: Aerospatiale's Transition to Open Computer Systems Analyzed

#### Strategic Reasons

94WS0462A Paris LE MONDE INFORMATIQUE  
in French 24 Jun 94 p 62

[Article by Aude Cottin: "At Aerospatiale, Transition to Higher Speeds"]

[Text] In a group such as Aerospatiale, the changeover to open-system architectures must take into consideration the history of organizations. This explains the different stages attained by Aerospatiale's operating divisions in their approach to rechanneling their skills, while reducing costs.

Steering persons and organizations toward open information systems is currently one of the major concerns of large-scale users. At Aerospatiale, where each major unit has important responsibilities relating to the choice of investments in hardware and applications programs, the approach is coordinated but not necessarily synchronized.

"Most of our activities take place within the framework of international, mainly European, cooperations that materialize by way of structures that differ historically and organizationally. The issue of migration toward open-system architectures arises each time, therefore, in a specific manner," says Guy Vauzeilles, Aerospatiale's director of information processing and investments.

#### Economic and Strategic Motivations

Unlike early organizations of the GIE [Economic Interest Group] type, still in use in the planes sector—Airbus, for example—those found in other sectors are integrated organizations, such as the Societe Franco-Allemande des Helicopteres [Franco-German Helicopter Company], an Aerospatiale subsidiary. And depending on whether planes or missiles are involved, reasons differ for changing from one system to another.

At the outset of the migration, in 1990, the group had some 15 information centers distributed throughout France for some 30 central units. Information processing and telecommunications represented an operating budget of around 5 percent of the group's annual revenue and employed 3 percent of the group's total staff.

"We launched a long-range systems simplification plan. It called for standardizing our applications systems, to start with, and then reducing the number of systems and homogenizing them," says Guy Vauzeilles. Four centers were shut down, and the number of central units was reduced by 50 percent. At the same time, the information-processing budget ratio per workstation was reduced from 100,000 French francs [Fr] per year to Fr80,000. Meanwhile, the number of workstations rose from 21,000 to 23,000 units, with a rise of 30 percent in the number of "smart" workstations.

Changes in personnel have affected mainly the staffs in subcontracting activities. Information processing and telecommunications presently employ a total of 1,100 persons. "Our current downsizing trend is being achieved mainly through nonreplacement of departing personnel," says Guy Vauzeilles.

Cost reduction, however, is not the sole reason for the change that is under way. From the strategic standpoint, our activity requires systems that are open to international partners and flexible.

Moreover, certain proprietary systems have now reached a technological impasse.

"We use open systems in the scientific domain, essentially in connection with two product lines: tactical missiles and civil transport planes. In the first of these cases, the transition has been achieved. In the second, we expect to achieve it by 1996," says Guy Vauzeilles.

Added to these reasons is the company's need to bring applications to bear that make a real contribution to the value-added component of its product lines. Hence the need for the information technology experts to make the transition from machine- and system-specific skills to skills more closely identified with the activity of the group.



### Difficulties of a Social Order

Aerospatiale analyzed the computer population and defined its target activities. "So as to ensure sufficient openness we did not carry this analysis down to the level of finely defined workstation profiles. . . But we know as of now that we shall need systems and telecommunications architects, persons closer to the users than to service and support activities," says Guy Vauzeilles. Project managers also will have to face up to a growing complexity needing to be addressed not in terms of a specific technical expertise but rather by way of a multidisciplinary approach.

"These are long-haul changes that must be achieved essentially through in-house training. We have chosen to go

about it gradually, application by application. This means that the recouping of our investment will take time, and the entire difficulty consists of managing it," says Guy Vauzeilles.

The technical difficulties—in terms, for example, of the networks that must facilitate access to the old as well as the new systems—are compounded by other difficulties that are of a social order. Who, for example, should be chosen as the first to be trained for the new applications, considering the advantages the beneficiaries will derive from such training? The idea seems to be to evolve the staff faster than the system as a whole, probably resorting to subcontracting for the old applications, without opting, however, for a transitional facilities management approach.

**In-House Staffing of Aerospatiale Information Technology Departments (1993)**

Function	Number of Employees	Trend
Management and operation of centers	60	Stable
<b>Design and development</b>		
Operations	320	Decreasing
CAD/CAM, scientific data processing	90	Decreasing
Methods and organization	40	Increasing rapidly
Systems	90	Increasing rapidly
Telecommunications	95	Increasing rapidly
Microprocessing and office automation	107	Increasing rapidly
Security	10	Increasing
Miscellaneous	30	Decreasing rapidly
Total	1,029	Decreasing

### Defense Division's Approach

94WS0462B Paris LE MONDE INFORMATIQUE in  
French 24 Jun 94 p 62

[Article by Aude Cottin: "Missiles Division: From a Geographical Organization to Specialized Units"]

[Text] To implement the changeover of its administrative, engineering, and financial operations to an open-system architecture, the Missiles Division began by reorganizing its information-processing service in depth. "With our information-processing service distributed over seven sites, we had a geographical organization characterized by redundancies and divergent policies. The need to specialize our personnel led us to form a study group to examine the Division's organization, together with its technical and financial aspects," says Pierre Paqueron, director of the group's Organization and Information Systems Division.

After six months of work by this study group, the new structure, consisting of five departments, began to emerge. The first, designated the Department of Information Systems Operating Architecture, consists of operation architects and analysts distributed according to domains of Division activity. They design evolutionary projects, and propose and conduct the prerequisite studies. The projects are then transferred to the responsibility of two project managers: one of them responsible for the projects' information-processing aspects; the other, for their user aspects.

Our architects are experienced in the conduct of processes. They are former project managers chosen for their knowledge of the company's operating environment, with an average of 10 or 15 years of service with the company," says Pierre Paqueron.

### Reinventing Their Specializations

The Department of Information Systems Development is the second major branch of the organization. Its project managers are responsible for developing solutions to the problems posed by the operations architects and for the installation of these solutions until acceptance. The third branch, the Production Department, is responsible for the release of the solutions that have become operational. It is also responsible for setting in motion the necessary corrective actions at the technical, implementational, and even human levels, in the case of repetitive problems stemming, for example, from a faulty taking in hand of the application by the user. It takes necessary action, knowing that during the installation phase the responsibility for user training and communication plans falls on the operations architects and project managers as a dual-element teamup.

The Technical Architecture Department is the fourth branch of the Missiles Division. Its engineers operate the means and choose the elements of the technical solutions. They also exercise technological oversight, determine the architectural details of the network, and conduct the

validation testing. Quality is assured by the fifth branch, the Quality Assurance Department.

A total of 160 regular employees, plus some 40 or so persons from outside sources, who are called upon for assistance on a regular basis, comprise the staffing of these Departments. "We have defined standard workstations. The assignment of the majority of the personnel has followed naturally. That of others has had to be studied case by case and arbitrated," says Pierre Paqueron. The migration of skills had in fact been anticipated as of the end of 1992. Today, it is at the strictly-speaking technical stage. In Pierre Paqueron's view, "In certain cases, their technical training already suffices to adapt individuals to their new positions." Thus, after regrouping the servers of the new architecture into operations work cells, the operators were given their choice of tool. "They chose it, tried it out, and were then asked to reinvent their specialization, to determine those aspects that would take on importance, and those that, on the other hand, would be the least burdensome by comparison with the old configuration."

But with Aerospatiale's halting of all recruiting because of the adverse economic situation, the Division is suffering from a relative shortage of UNIX system and network engineering skills. Specialists from outside sources are therefore being brought in and integrated with the company's regular staff to provide high-level expertise and a transfer of skills in these specializations.

As another consequence of the economic situation, in-house development of applications is being replaced by the procurement of packaged software wherever this is possible. "This represents another revolutionary change for us who were our own prime contractors. We are sending seasoned project managers out on exploratory missions, which to them amounts to an apprenticeship of the integration function," says Pierre Paqueron. "The experiment is a delicate one, because choosing a complex software package is difficult. It requires expert knowledge and a sound methodology, which we did not find in the marketplace." A study group therefore tried to isolate in advance the required components of such an approach and to define the route to follow. Experience has shown that project managers prove highly vulnerable to the commercial aspects. Thus, an experienced hand from the procurement office has been assigned to each team.

#### [Box p. 63]:

#### Space and Defense Division: Study Is Under Way

Although the Space and Defense Division is not talking yet in terms of revamping its organization, a study of specializations is under way.

Its first finding: Computer specialists must acquire cross-specializations, ranging from applications, to networking, to servers. "Very few people master the entire gamut. But we are embarking on the migration from the information center to the client/server relationship. Utilizing the user-friendliness of the microcomputer to query the central database already represents a cultural revolution," says Christian Tanon, the division head of organization and information technology.

The next stage, between now and the end of the year, will be the utilization of client/server prototyping tools to develop applications. "The problem is that the office-automation revolution has touched only the outer edges of that domain. The client/server and object-based programming will go to its very core. This will require a real strategy of change," says Christian Tanon.

The question remains as to whether the information technology specialists should be associated from the outset with the process of revamping the division organization. "It is a real debatable issue, in that, at Aerospatiale, the Departments of Organization are for the most part separate from the Information-Processing Departments. This means that we have yet to resolve that problem," Guy Vauzeilles concludes.

#### Arianespace CEO Addresses Shareholders

BR1608104794 Paris ARIANESPACE NEWSLETTER  
in English Jul/Aug 94 pp 1-4

[Unattributed article: "Results and Prospects"]

[Text] Following the Annual General Meeting of Shareholders held in Paris on 14 June 1994, [Arianespace CEO] Charles Bigot hosted a press conference to review current activities and the outlook for the future, from the perspective of ten years of operation as a space transportation company.

#### Yesterday...

"Ariane 4 operations are a source of great satisfaction and pride for Arianespace", said Mr. Bigot. After 28 Ariane 1, 2 and 3 launchers, 35 Ariane 4s have been launched with great regularity since December 1988, placing into orbit a total of 57 satellites. Three-fourths of these 35 launchers carried a heavy payload of some 4 metric tons or more. With 80 percent of launches in the dual configuration, Arianespace has demonstrated the value of this option, which helps significantly reduce launch costs.

The production rate was increased from 8 launchers per year to 9, then 10 in 1994 and 1995. The European space industry has benefited from such regularity, since a sustained production rate is essential to guarantee not only production quality but also productivity.

The P9 plan (an order for 50 Ariane 4s), carried out in accordance with the schedule defined in 1987, has enabled the necessary productivity gains.

"1993 was a typical year", stressed Charles Bigot, similar to the five or six previous years, with seven launches carried out in spite of a five-month interruption. "In December, we launched the flight scheduled for that month, thus demonstrating that we were able to reach our objectives in spite of incidents." In 1993, ten satellites and seven auxiliary passengers were successfully orbited.

High customer confidence in Ariane was confirmed with the signing of 16 firm launch contracts in 1993, including contracts with the last two major operators who were not yet customers of Arianespace: AT&T, the leading operator in the United States, and Indonesia's PALAPA system, the first satcom system in South-East Asia.

Financial results are good. Arianespace posted net income of 147 million French Francs (Fr) in 1993, on sales of Fr4,407 million. It paid total dividends of Fr16.2 million, equal to 6 percent of capital. Since its creation 1980, Arianespace has always enjoyed a healthy financial base, and has paid dividends to shareholders for the past nine years.

Company funds increased by approximately Fr450 million. Provisions for technical and commercial risks inherent to the space transport business were Fr1.9 billion as of December 31, 1993.

#### Today...

Despite these excellent results, Arianespace remains very aware of problems inherent to its field. After the Flight 63 failure, following a string of 26 successful launches, considerable efforts were made: "This meticulous, intensive and persistent work, carried out very quickly, has been and will be most fruitful. I am fully convinced that we have eliminated a weak point in our Ariane 4 launch system," said Mr. Bigot.

Customers seem to have appreciated the reaction of the Ariane community: five contracts were signed within two and a half months after Flight 63—demonstrating once again the credibility of the Ariane launch system, recognized throughout the world.

During the flight interruption, Arianespace, in conjunction with its industrial partners and the Guiana Space Center, worked on creating the conditions that would allow it to "immediately make up for delays." With reinforced operational teams, increased production rate and shorter launch campaigns, Arianespace will be able to reduce the interval between flights to three weeks if necessary.

"This capability," stressed Mr. Bigot, "leads me to believe that we will be able to maintain our goal of ten launches in 1994. But we will continue to give top priority to quality; if it is necessary to delay a launch by one or several weeks, I will not hesitate to do so."

Ariane 5 activities were already well under way in 1993: at the Paris Air Show, with the signing of the first production contracts; in the fall, with the large-scale meeting of European manufacturers at La Villette. Arianespace launched the production of 14 Ariane 5s for the first four years of operations, and determined contract specifications and ambitious cost objectives. These contracts will be finalized this year.

The Sales and Marketing Department is already negotiating contracts with a launch option on Ariane 4 or Ariane 5.

Arianespace's operational teams have long been involved in the test process, in particular in the complete first-stage tests soon to begin in Kourou.

#### Tomorrow...

Developed "with brio" by ESA and CNES [National Center for Space Studies], Ariane 5 will be ready on time. "We are very, very satisfied, because Ariane 5 will enable us to launch the large, 3-ton satellites which are the most

common today," said Mr. Bigot. The first commercial Ariane 5 (503) should therefore lift off at the end of 1996, as scheduled.

1996 will be a most interesting year for the space world: apart from Ariane 5, it will see the arrival of the Proton and Long March 3B launchers on the market. Arianespace has faced competition for ten years now, first with NASA then with conventional launchers from the United States. The company does not underestimate the new competition and accepts it without undue concern. However, Mr. Bigot again stressed the fact that governments must act and "not allow on the market launchers with unknown costs and with prices freely determined by their commercial operators."

To meet the challenge of increasingly fierce competition, Ariane 5, offering reliability of approximately 98 percent and capable of a dual launch of satellites in the 3-metric ton class, will be the perfect answer to the needs of the market, 75 percent of which comprises telecom satellites weighing 2.4 to 3.6 metric tons.

Arianespace's Chairman concluded by reminding listeners that the company's vocation is to meet all orbital placement and space transportation needs: this includes small launchers—which call for a realistic study—and "discovery of the universe" programs which go beyond the field of "applied space." "Arianespace is Europe's space transportation company."

After this broad review, Charles Bigot fielded questions from journalists. Here are excerpts from some of his answers.

#### Flight 64 Delay

"On June 3, the hydrogen cryogenic arm did not open, because the pipes on the hydrogen plate—which had never caused a problem before—turned out to be more rigid than we thought. This was corrected by clearly defining the minimum degree of flexibility required, changing pipes on both the hydrogen and oxygen sides, and carrying out extensive tests on the plates equipped with the new flexible pipes under extreme conditions. These tests were 100-percent successful."

#### Flight 63 and Space Business Risks

"In the space transportation business, making difficult technological choices is unavoidable. We knew that the submerged oxygen bearing was a sensitive area. However, it took long studies to ensure that a coated bearing would not have adverse effects. Also, margins seemed sufficient, Flight 63 showed that this was not the case when several extreme conditions were accumulated on the same flight—and the chance that this would happen, statistically, was very slight. With the modifications now made, I believe that this can be taken off our list of sensitive areas."

#### The Cost of Flight 63

"Arianespace always makes provisions in its accounts and takes insurance to cover a possible failure. These provisions were not badly affected by Flight 63, although consequences were heavy—the loss of satellites, the loss of the launcher, and the amount insured. In particular, it was very costly for our S3R reinsurance company, which covered part of the insurance." (...)



"Any interruption of launches involves heavy expenses, because fixed costs will only be covered if we carry out as many launches as scheduled during the year. It is therefore too early to know the actual cost of Flight 63. All other costs—additional teams, overtime, disassembly and reassembly operations on several launchers, tests, etc.—should be close to Fr100 million."

#### More Ariane 4s?

"Ariane 5 commercial operations should start late in 1996/early 1997 with Flight 503, and we have drawn up a flight schedule for the first few years. However, we will need to continuously adapt the number of Ariane 4s required to fulfill our commitments. This is why—though we have not yet decided to order additional Ariane 4s—we have ordered certain elements which would enable us to do so if necessary."

#### Ariane 5 Cost Objectives

"We gave manufacturers absolute cost objectives rather than cost reduction objectives, since we do not have any reference figures yet. These objectives, based on our knowledge of current production of given elements, are ambitious. But I am certain that manufacturers will be able to meet them."

#### Ariane 5 and Insurance

"Insurers should offer much better rates on Ariane 5, which has a reliability rate of 98.5 percent (for the moment theoretical, of course). I think that they will rapidly reduce their rates, if not during the transition phase, at least in the near future, and that these rates should be close to 5 percent."

#### Capacity Trends

"I don't think that telecom satellites will weigh more than an average of 3 to 3.2 metric tons in the next few years. For the period 2000-2010, an upgraded version of Ariane 5 with a capacity of twice 3.5 metric tons would seem a good choice to me." (...)

"Apart from profit-making or application satellites, there are other missions, such as space exploration programs. Ariane 5 will therefore be upgraded according to objectives assigned by the European Space Agency. (...) I am convinced that Ariane 5 today is similar to Ariane 1 twenty years ago; one day, there will be Ariane 54LPs, 54Ps, maybe even 58LPs..."

#### United States Competition

"The United States competition for the next five years seems clear to me: Thor Delta, a non-cryogenic launcher, simple and with excellent reliability, though not powerful enough; and Atlas Centaur, which has reached its last stage of development. This competition is serious and effective, and we respect it."

#### Europe's Space Choices

"For me, at least 50 percent and maybe more of all resources allocated to space must first fulfill the needs of 'applied space.' But I believe that new utilizations of space must be found, and this requires a deliberate commitment. There is also the discovery of the universe: I don't think it must be given priority, but it is a vital human need. Therefore I hope

that European space programs will not only include scientific applications but also true discovery programs."

#### France: 1993 Annual Report for Dassault Electronique

BR1708120594 Paris LA LETTRE DU GIFAS in English 14 Jul 94 p 2

[Unattributed article: "Dassault Electronique: Report for 1993"]

[Text] In 1993, the Group returned to profitability (following the 1992 losses due to restructuring) with a significant increase in orders (9 billion French francs [Fr]) of which nearly half, for export.

1993 (in millions of French francs)		
	Dassault Electronique Group (Consolidated)	Dassault Electronique (Societe)
Revenue	3924 (+1.3 percent)	2770
Orders Booked	5172 (+27.6 percent)	4148
Orders Pending	9010 (+16.3 percent)	8182
Net Profits	+ 50 (against -226)	+46.2

In view of the priority given to strengthening its funds, the mixed Assembly General of Dassault Electronique has decided that no dividend will be paid for 1993. Consolidated revenue for 1994 is expected to show a growth of 7 percent, at approximately Fr4.2 billion, excluding the new operation for external growth. Activities, excluding defense, are expected to increase to reach 40 percent of the total. The return to a profitable situation has cancelled out financial debts. As of 31 December 1993 the net treasury of the Group was Fr355 million.

#### Telecom Italia Merger Creates Major International Competitor

94WS0487A Turin RICERCA & INNOVAZIONE in Italian No. 36-37, 1994 pp 16-18

[Article by Fz. P.: "'Telecom Italia' the World's Sixth Largest Telecommunications Carrier: Sole Operator of Italian Telephony Gets Under Way"]

[Text] The merger of SIP [Italian State-Owned Telephone Company], ITALCABLE [Cable and Radio Services], TELESPIAZIO [Space Communications Company], IRI TEL and SIRM [Italian Maritime Radio Company] marks the beginning of a new phase in the history of Italian telecommunications. The advantages are several: quality and quantity of services are improved, ability to compete is enhanced, and overlapping of services is eliminated.

For Italian telephony, 17 May was an historic date: The official date of birth of Telecom Italia, Italy's new sole telecommunications carrier. The "ragout" consisting of five different companies, SIP, ITALCABLE, IRI TEL, TELESPIAZIO and SIRM, that shared telephone services and jurisdictions, disappears, and is replaced by a single entity with potentials and ambitions on a world scale. Suffice it to consider that with its projected 26.8 trillion

lire of billings for 1993, Telecom Italia becomes the world's sixth largest carrier in terms of billings.

"Telecom Italia will be able to be included in the limited number of carriers capable of operating on a world scale." This statement opened the meeting held in Turin marking the launching of Italian telephony's new single carrier. The meeting dwelt mainly on the formalities of the merger and on the election of the new corporation's top management.

The new executive organization chart called for the appointment of a president, a vice president, and three general managers.

Ernesto Pascale will be Telecom's president and chief executive officer. The position of vice president created under him will be filled by Filippo Gagliano, general manager of STET (Turin Telephone Finance Company). Elected to the three positions of general manager are: Francesco Chirichigno for the Residential Customers and Network sector; Vito Gamberale for Planning and Administration; and Tommaso Tommasi di Vignano for Business Customers and International Services.

The Space Division is slated to become autonomous and will be headed by Raffaele Minicucci; but temporarily, it has been assigned directly to Pascale. With regard to the board of directors, the meeting adopted a streamlined version consisting of only nine members. It is possible, however, that before 18 August, the date on which the company will be listed on the stock market, six additional members may be elected to the board.

#### Why Telecom Italia

The creation of Telecom Italia represents a fundamental turning point in the development strategies of the Italian telecommunications industry.

The growing severity of competition, the demand for ever more advanced products and services, and the rapidly changing regulatory environment are only a few of the reasons that made a radical change inevitable in the sector's organizational structure in Italy.

The creation of a single and only Italian operating entity stems from vital strategic considerations. These include: the far-reaching conversion process currently taking place in the telecommunications sector, characterized by a feverishly accelerated pace of technological development; the evolution of the regulatory environment toward greater liberalization of the sector; and the globalization of markets. The fundamental importance of all these factors demands that they be addressed from a unitary organizational, management, and operating standpoint.

The providing of Italian telecommunications services by a sole operating entity will contribute not only to improving the quality and range of services offered, but also and assuredly to the creating of synergies and competitive advantages with respect to capital to be invested, services

offered to clients, profit-yielding improvements, and elimination of all forms of duplication of investments and dissipation of assets.

The advantages of the merger are many. In the first place, it will be possible to fully integrate the telecommunications industry's various components operating in Italy, enhancing to the utmost their ability to compete in this sector, which is strategic for Italian industry as a whole. Secondly, the greater concentration of intellectual and financial resources that becomes available can be devoted to technological development that will lead to a net improvement in productivity, with elimination of waste and overproduction, as the gamut of services offered to clients is broadened, their quantity increased, and their quality improved.

#### Financial Aspects of the Operation

The creation of Telecom Italia is thus part of a more comprehensive evolution of the Italian telecommunications system, with STET as its driving force: "The launching of a Sole Operator, and the birth of Telecom Italia are Italy's response to the telecommunications conversion process currently taking place worldwide," said Michele Tedeschi, STET's chief executive officer, commenting on the five companies' merger deliberations.

"The forming of the new corporation brings into being the world's sixth largest telecommunications carrier in terms of billings. As Italy's sole telecommunications entity, it will provide a sound starting point, a strong structural basis, and a substantial wealth of professional and technological resources aimed at ongoing improvement of the quality of services it offers to its national and international clientele."

J.P. Morgan and Albertini & C. Sim were retained as the financial consultants for the valuation of the five companies involved in the merger. The first, based in New York, engages, in Italy, in all activities typical of a merchant bank, and is particularly present in the corporate finance and the portfolio financing and management sectors. The second, originally the "Studio Albertini Agenti di Cambio" firm, specializes in a broad range of financial services (intermediation and securities management), nonbanking activities, and activities in the "sophisticated" financial products sector.

The work of the two financial consultants, which began on 3 January 1994, was concentrated mainly on the objective of providing a single exchange ratio between the shares of SIP and those of each of the other companies.

First, based on the sector in which they operated, their history and visibility, and independently of their size, the five companies that make up Telecom Italia were rendered homogenous by means of valuation methods widely used in international financial markets.

Then, a determination was made of the value "ranges" of the economic capital of the five companies, and consequently the equitable exchange ratios between the shares of ITALCABLE, TELESPAZIO, SIRM, and IRITEL, and those of SIP.

**Five Companies' Economic Capital Value Ranges**

Company	Minimum Value (billions of lire)	Maximum Value (billions of lire)
SIP	29,401	35,111
Italcable	3,008	3,250
Telespazio	391	457
SIRM	30	32
IRITEL	708	936

**Number of SIP Shares To Be Issued Per Share**

	Common	Savings
Italcable	2.4	2.4
Telespazio	2.0	
SIRM	4.25	
Iritel	3,150	

The Boards of Directors of the five companies agreed mutually on the following share exchange ratios: 2.4 shares of SIP common stock (at a nominal value of 1,000 lire per share) for each share of Italcable common stock (nominal value per share 1,000 lire), and 2.4 SIP savings shares (nominal value 1,000 lire) for each Italcable savings share (nominal value 1,000 lire); 2 shares of SIP common stock (nominal value 1,000 lire) per share of Telespazio common (nominal value 1,000 lire); 4.25 shares of SIP common (nominal value 1,000 lire) per share of SIRM common (nominal value 2,000 lire); and 3,150 shares of SIP common (nominal value 1,000 lire) per share of IRITEL common (nominal value 1,000,000 lire).

In order to finalize the share exchange transaction, on whose congruity the Arthur Andersen & Co. SaS and Reconta Ernst & Young SaS auditing firms will draw up a report, SIP increased its capital stock to a maximum of 903.85 billion lire, by means of an issue of a maximum of 663,850,000 shares of common stock and a maximum of 240,000,000 savings shares, all at the nominal value of 1,000 lire per share, with dividend payable 1 January 1994.

When the transaction is completed, the maximum capital stock of the corporation that takes over will be approximately 7.277 trillion lire.

[Box p.18]:

**Significant Stages in the Creation of Telecom Italia****1992**

29 January: Enactment of Law 29/1/92 No. 58 starts up the restructuring of the Italian telecommunications sector.

20 March: Board of Directors of IRI [Institute for Industrial Reconstruction] gives the green light to the incorporation of IRITEL SpA which will absorb the activities of ASST [State Telephone Services Agency].

26 September: IRI approves the Telecommunications Sector Restructuring Plan, which must then be submitted to the CIPE [Interministerial Committee for Economic Planning] by the ministers concerned.

29 December: ASST activities are formally transferred to IRITEL SpA [joint stock company]. From this point on, IRI, through its subsidiaries, administers almost all Italian telecommunications assets.

**1993**

2 April: CIPE expresses the need to implement the restructuring plan by merging IRI's concessionary telecommunications operating companies into a single operating entity.

It also outlines a plan for gradually reducing the government's presence in the sector to not more than a minority share.

30 June: IRI's Board of Directors approves the Telecommunications Sector Restructuring Plan within the framework of the general guidelines set by CIPE.

Decision is reached to merge the activities of SIP, ITALCABLE, IRITEL, TELESPIAZIO and SIRM into a single operating entity.

30 July: Minister of Post and Telecommunications Pagani sends to IRI his approval of the Telecommunications Sector Restructuring Plan, directing that the creation of the single operating entity take place before 30 September 1994.

23 December: The five companies involved in the merger agree on J.P. Morgan and Albertini & C Sim as the consultant firms to be retained to determine the share exchange ratios.

On 3 January 1994 the two consultant firms are formally retained to independently value the five companies involved in the merger, and provide a single share exchange ratio between the shares of each company and those of SIP.

**1994**

19 March: The boards of directors of SIP, ITALCABLE, IRITEL, TELESPIAZIO and SIRM deliberate over the merger and the share exchange ratios on the basis of the recommendation submitted by the two consultants.

17 May: Meetings of the boards of directors of the five companies involved in the merger give the green light to TELECOM ITALIA, Italy's first sole telecommunications operating entity.

**Netherlands: Fokker Receives Capital Injection from DASA**

BR2308140294 Rotterdam NRC HANDELSBLAD  
in Dutch 8 Jul 94 p 1

[Unattributed article: "The State Still To Decide. DASA To Support Fokker With Half A Billion"]

[Text] Rotterdam, 8 July—The destitute Dutch aircraft manufacturer, Fokker, is to receive an injection of capital of between five hundred million and one billion Dutch guilders from its parent company, German Aerospace [DASA].

This will cover two-thirds of Fokker's financial needs. The Dutch government is also once more to invest in Fokker.

A spokesman for Fokker today confirmed the statement which Fokker's senior executive, Ben van Schaik, had



given to the German newspaper DIE WELT. "DASA will substantially increase its involvement (...). More than two-thirds of Fokker's capital requirements will come from DASA," said Van Schaik during the interview. Neither the Ministry of Economic Affairs nor Fokker would give any details this morning about the injection of capital. The expectation was that Minister Andriessen of Economic Affairs and Fokker's senior executive would provide more information on the support operation in a joint press conference to be held later this afternoon.

Fokker is desperately in need of an injection of capital. The aircraft manufacturer last year recorded a record loss of 460 million guilders, as a result of which its own property as a percentage of the total balance dropped to 11 percent. Fokker had already announced this spring that it was essential that its two large shareholders should "clean up" the balance. DASA, through its Fokker holding company, owns 51 percent of the Fokker shares, while the Dutch government has a 22-percent interest in the Fokker holding company.

Van Schaik also let it be known how Fokker intends to use the injection of capital to improve its financial situation. Fokker will set up a leasing company, in which DASA will probably take a majority interest. That airlines are increasingly showing preference for leasing rather than making outright purchases has had a strong effect on Fokker's financial position. Because aircraft are more often leased than purchased means that Fokker has been unable to benefit from down payments made by customers and has above all had to act as a sort of "banker". If DASA takes over a large part of this role, then a financial burden for Fokker will disappear.

Van Schaik is predicting that Fokker will not be making a profit again until 1996. Fokker expects the loss for this year to be lower than the record loss for 1993.

## EAST-WEST RELATIONS

### Joint EU-CIS Research Projects

BR1708103794 Paris AFP SCIENCES in French  
4 Aug 94 p 1

[Unattributed report: "Europe-CIS: 459 New Joint Research Projects"]

[Text] Brussels—The International Association for the Promotion of Cooperation with Scientists in the Independent States of the Former USSR (INTAS) recently decided to support 459 joint research projects and the linking up of projects involving some 1,400 laboratories in the countries of the former USSR and some 1,600 laboratories in Western European countries, an INTAS statement announced.

All in all, ECU21 million will be earmarked for these projects, according to Mr. Antonio Ruberti, the European Commissioner responsible for research. Between June and December 1993, INTAS had already decided to support 560 projects previously submitted. At the end of the current year, ECU54 million will be allocated to some 1,000 research projects in all the exact, natural, economic, social, and human sciences.

The latest 450 projects chosen were selected by some 100 experts from among 4,700 proposals. Some 23 percent of the projects dealt with physics, astronomy, and astrophysics, 20 percent with life sciences, 16 percent with earth sciences, the environment, and energy, 15 percent with engineering, aeronautics, and space, 9 percent with chemistry, 9 percent with economic, social, and human sciences, and 8 percent with mathematics, information technologies, and telecommunications.

Lastly, in order to facilitate their integration into the international scientific community, INTAS has decided to allocate ECU200,000 over the next two years to providing scientists in the CIS countries with scientific journals—especially in the chemistry sector.

INTAS was created in June 1993 by the EC, along with Austria, Finland, Norway, Sweden, and Switzerland.

### France: Sourdille Report Recommends R&D Cooperation in East Europe

94WS0456A Paris AFP SCIENCES in French 7 Jul 94 p 1

[Article: "Sourdille Report Says Scientific Cooperation with East Europe Must Continue"]

[Text] Paris—Despite the imperfections and problems encountered, France must continue to cooperate with the countries of Central and East Europe, says a report prepared for the Parliamentary Office of Evaluation of Scientific and Technological Options by Mr. Jacques Sourdille, RPR [Rally for the Republic party] senator from the Ardennes and former state secretary for research. The report's conclusions, made public on 30 May, were adopted unanimously.

The result of interviews over a 2-year period with 350 French, Russian, Czech, Hungarian, Baltic, Polish, American, British, and European Commission personalities, the 155-page document is described by Mr. Sourdille as an "interim report." It summarizes "the current state of research in the countries of the former USSR and its [former] satellites;" it shows serious weaknesses and the need to adapt to an entirely new situation—one that is catastrophic from a budgetary standpoint—but also shows several poles of excellence.

There can be no doubt: We must continue to cooperate with East European researchers, taking into account national idiosyncrasies that have emerged since the fall of the Berlin Wall but realizing and admitting that it is impossible to "fix everything wrong in the world" and that "we will have to do what we can to advance our interests," both national and European, which is only possible starting from an accurate appraisal of these countries' systems and capacities.

France and the European Union have "dithered and vacillated" too long, while the United States and Israel, in particular, were skimming off the best researchers and launching cooperation projects with the best laboratories. In the current transition phase, where nothing is firmly settled and where, insofar as Russia is concerned, it is unclear who has power—the Ministry of Research or the institutes of the Academy of Sciences—it is difficult to

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pursue cooperative projects without having funds earmarked for experiments disappear.

According to Mr. Sourdille, taking into account the best information available on these countries and the numerous existing "imperfections," we must continue moving forward and establish "diversified, complex, multidimensional, and original policies of balanced cooperation." "Both France and the European Union have a lot going for them," even if—unlike the Americans and Israelis—they have refused to exploit the East European brain drain.

Between 2,500 and 3,000 very good researchers from the former Soviet Bloc have been recruited by those countries, but according to Mr. Sourdille the policy is now backfiring, and an increasing number of "acquisitions" are going back. The report urges establishment in Brussels of a "clearinghouse on cooperation with the countries of Central and East Europe" to coordinate bilateral and multilateral action; it also urges France to increase the number of science advisers and attaches.

#### **Russian Federation Joins EUTELSAT**

94WS0456C Paris AFP SCIENCES in French  
7 Jul 94 p 10

[Article: "Russia Now Full Member of EUTELSAT"]

[Text] Paris—As of 4 July, the Russian Federation became the 41st full-fledged member country of the European Satellite Telecommunications Organization (EUTELSAT), the organization has announced. The definitive accord was signed at EUTELSAT headquarters in Paris by the Russian posts and telecommunications minister, Mr. Vladimir Bulgak.

The entry of Russia, the principality of Andorra, and Bulgaria into the European organization was approved unanimously at last May's general assembly of member countries. In March 1994, Estonia, Lithuania, and Moldova joined EUTELSAT. Belarus has also applied for membership. In all, 20 new countries have become members of EUTELSAT since the November 1989 fall of the Berlin Wall, but not all of them belonged to the former Soviet Bloc.

Russia already enjoyed access to EUTELSAT satellites for telephone service and commercial communications. It plans to use them for distribution of television and radio network programming.

EUTELSAT operates seven satellites, four Eutelsat-2 and three Eutelsat-1, which provide telecommunications, radio and television broadcasting services, data transmission, and mobile phone link-ups.

#### **France's Framatome To Study Russian Nuclear Power Stations**

94WS0456D Paris AFP SCIENCES in French  
7 Jul 94 p 19

[Article: "Contract With Framatome To Improve Safety of Russian Power Plants"]

[Text] Paris—Framatome, the French nuclear reactor builder, announced on 5 July in Paris it has signed with

Russia a 1.3-million-franc study contract to improve operations and safety at nuclear generating plants.

The contract provides for Framatome to collaborate with Russia in a study of ways to improve "optimization of operational safety margins" in the most important types of reactors. Methods and procedures used by Europeans and Russians in two reactor types—pressurized-water reactors (VVER) and fast-neutron reactors (Superphenix)—will be analyzed and compared.

The contract is an offshoot of a cooperation project launched in August 1991 by the European Commission to encourage Russian specialists to embrace the nuclear "safety culture" found in West Europe. Future Russian power-plant projects could profit from these knowledge transfers. In all, ECU6 million has been authorized to date for this activity.

### **EUROPE-ASIA RELATIONS**

#### **France's Aerospatiale Signs Aerospace Agreements With China**

94WS0448A Paris AIR & COSMOS/AVIATION  
MAGAZINE INTERNATIONAL in French  
11-24 Jul 94 p 12

[Article by Jean-Pierre Casamayou: "Aerospatiale Bets on China"—first paragraph is AIR & COSMOS/AVIATION MAGAZINE INTERNATIONAL introduction]

[Text] The Aerospatiale CEO [chief executive officer] signed three cooperation agreements with China, including one covering the development of a 100-seat aircraft.

Economic relations between China and France are getting warmer. Thus, during the last trip of Gerard Longuet, the minister of industry, several French manufacturers were able to obtain assurances concerning several contracts amounting to a total of some 5 billion French francs [Fr]. For once, too, the aeronautical industry was not forgotten. In addition to the Chinese authorities' commitment to put Airbus Industrie airliners on the same footing as Boeing's, Louis Gallois, the Aerospatiale CEO, signed three cooperation agreements in the space, helicopter, and aeronautical engineering sectors. In addition, he indicated that the French group would set up a permanent office in Beijing.

The most interesting proposal is that concerning Aerospatiale's participation in the construction of a 100-seat aircraft. Louis Gallois proposed to the state-owned company AVIC (Aviation Industries of China) to cooperate in developing and marketing a twin-jet aircraft that would stand between the largest projects of the ATR GIE [Commuter Aircraft Economic Interest Group] and the A319 of Airbus Industrie. The French aircraft manufacturer would thus join the Korean Samsung which has already signed a cooperation agreement on that subject with AVIC last November.

In doing this, Aerospatiale wants to differentiate itself from its American competitors, which are already well established in China. While Boeing offers only subcontracting, and McDonnell Douglas construction under

license, the French propose a full partnership with the Chinese industry, covering development as well as production and marketing.

As for the other two draft agreements, they have to do with space and helicopters. With China Aerospace, the French group signed an industrial and commercial cooperation agreement covering weather and telecommunication satellites. Finally, in the helicopter sector, which has been cooperating with China for a long time already (in particular for the construction under license of the Dauphin, and the development of the P-120), the ties should also get closer. Besides, Jean-Francois Bigay, the Eurocopter CEO, is in turn about to head for China to consolidate existing business and drum up some more.

### French Automotive Industry's Penetration in China Analyzed

94WS0453A Paris L'USINE NOUVELLE in French  
14 Jul 94 pp 32-33

[Article by Alain-Gabriel Verdevoye: "The Long March of French Equipment Manufacturers in China"; introductory paragraph in boldface as published]

**[Text] French equipment manufacturers in China are following right behind PSA [Peugeot Corporation] and Renault, which may be producing over 500,000 vehicles locally by the year 2000. The Chinese market is reserved for industrialists with strong nerves.**

Like the vast jumble of new tours and highways being added every day to Beijing, a city already caught up in traffic jams, the Chinese automotive industry is swimming in euphoria. Growth forecasters are vying to outdo each other in optimism. The more cautious are counting on the production of 2 million vehicles in the year 2000. But for their part, the organizers of the luxurious Beijing Automobile Show, which was reserved for professionals (it was held in the Chinese capital from 23 to 29 June), are gambling on 3 million. One thing needs to be noted: a tenfold increase in the number of vehicles in China, which has 100 times fewer than France, would make it, because of the country's size, a market as big as that in Europe!

Hence the vibrant appeal made by Alain Carree, 51, the boss of Sogedac, the PSA's central purchasing agency, who invited 80 of his suppliers to a big jamboree at the

Sheraton Hotel in Beijing on 24 June. To encourage them to keep up with the growth of French manufacturers. A tough challenge.

In the red mud of an idle industrial suburb at the end of a narrow rutted road, the Peugeot plant in Canton is simmering with excitement. Despite the tropical mugginess. The first French automobile manufacturing unit in China, having been established in 1985, it is preparing to double its capacity to 50,000 Peugeot 505's and 504's by next October. At an investment of 800 million French francs [Fr]. But Pierre de Montgolfier, 49, the operations manager of that joint venture in which Peugeot has a 22-percent interest, has been negotiating (since the end of 1993) to get approval for a plan calling for a new unit capable of producing 150,000 Peugeot 405's per year. Production could start in 1998.

In Wuhan, 900 kilometers to the north, the first buildings of what will be Citroen's plant are barely off the ground. This plant, which will be operational in mid-1996, is designed to produce 150,000 four- and five-door ZX's per year with the assistance of an engineering shop in Xiangfan 350 km away. A project for also manufacturing 150,000 additional units of the successor to the small AX is under discussion. Near the Dong Feng Citroen Automobile Company, in which Citroen holds a 25-percent interest, Renault will begin producing Trafic commercial vehicles next year.

But to satisfy Chinese requirements with respect to local integration (90 percent eventually), PSA must attract at least 120 equipment manufacturers in its wake. So far, only about 30 of them have granted licenses or formed joint ventures in China. Another 30 or so may commit themselves by the end of the year.

That timidity worries Alain Carree. The French are only at the beginning of their "long march." Indeed, establishing a business in China means a long and expensive journey for the fighter.

The first pitfall concerns the selection of one's partner. That partner is usually imposed by local authorities. "We are holding talks with a Cantonese manufacturer of lamps of mediocre quality who has tried to copy our products," says Denis Montavon, 42, president and CEO of Socop Industries, a manufacturer in Franche-Comte of ceiling lights and lighting systems for license plates. "I have visited about 20 Chinese firms. Some of them remind one of France in the 1950's. Others have very good quality equipment, but the personnel do not always know how to use it," Alain Carree admits.



**French Equipment Manufacturers in Place (Significant agreements already signed with Chinese partners)**

Company	Products	Type of agreement	Customers
Bertrand Faure	Seats	Licenses	Citroen, Peugeot, Volkswagen
Ecia	Exhaust systems	Joint venture (25%)	Citroen
Ecia	Plastic parts	License	Peugeot
Magneti Marelli (Jaeger)	Controls under steering wheel	License	Citroen
Sagem	Ignition	License	Peugeot
Speedrill	Screws and bolts	Joint venture (55%)	Citroen, Peugeot, Volkswagen
Treves	Floor carpeting	License	Citroen, Peugeot, Renault
Valeo	Wipers, lamps, clutches, heating	Licenses and joint venture	Citroen, Peugeot, Renault

Source: L'USINE NOUVELLE.

**Renegotiating for 24 Hours**

The second difficulty is the slowness of negotiations. "Our first contacts date back to 1981. It took 10 years for us to grant our first license for metal seat frames intended for Peugeot and five years to sign technical agreements with Military Factory 3303 in Wuhan, which is going to be supplying Citroen with seats by the end of next year. The Chinese are formidable negotiators. When I arrived last May—at 1000 hours on a Friday—to sign the contract, they wanted to renegotiate. It took 24 solid hours," recalls Junio Vasconcelos, 58, director of international business for Bertrand Faure. Bernard Ginet, 41, president of the PME [small or medium-size business] Speedrill in Besancon, Doubs, has had to make two or three trips per year since 1989 to set up a joint venture in southern China that specializes in screw connectors. Besides PSA and Renault, he is also aiming at the Volkswagen market in Shanghai. Treves, the manufacturer of automobile textiles that has just granted a license for floor carpeting in Shanghai, had to send no fewer than eight successive missions to China and play host to three Chinese delegations in France.

The third difficulty has to do with keeping a permanent team in China from the moment one's first projects materialize. The ACG [expansion not given], a subsidiary of General Motors that has already signed six local agreements, employs about 15 people, including 14 Chinese, in its Beijing office. That office played an active role in setting up a joint venture to produce alternators/starters for Citroen last December.

"We have 12 people locally, including nine Chinese. To negotiate, but also to study our competitors' prices and products, adapt our products, and provide technical assistance," emphasizes Jacques Billiard, 47, vice president for North Asia at Schneider Electric, which has been in China for 20 years. In particular, that electrical engineering firm is going to help Chinese machine-tool manufacturers meet Citroen's specifications. It has established a training center for that purpose in Wuhan. Six Chinese instructors are already at work.

**Export Base With Low Wages**

Lastly, immediate profits should not be expected. Ecia hopes to earn money three years after beginning its activity and to wipe out its debt the year after that. This subsidiary of Peugeot has just set up a company with the Chinese firm

Tongda to produce exhaust systems. Construction of a plant has started in Wuhan. The firms will start deliveries in July 1995.

Bertrand Faure, which has put about 100 people to work on its Chinese projects, is very cautious about the operation's short-term profitability. But how can one stay out of the largest potential automotive market and deprive oneself of an industrial export base paying wages of Fr400 per month? Alain Carree warns: "If our suppliers do not follow us, we will be forced to turn to the Japanese." A word to the wise is sufficient.

**France's Ariane Rocket to Launch Malaysian Satellite**

94WS0455A Paris AFP SCIENCES in French  
13 Jul 94 p 11

[Article: "First Malaysian Telecommunications Satellite to Be Launched by Ariane"]

[Text] Paris—The Arianespace company has announced that MEASAT-1, Malaysia's first telecommunications satellite, will be launched in late 1995 by a European Ariane rocket. An agreement to this effect was signed on 7 July in Paris by Tunku Mahmud bin Tunku Besar Berhanuddin, general director of the Binariang SDN BHD company for which the satellite will be launched, and Ralph Jaeger, Arianespace's commercial director, during Malaysian Prime Minister Mohammad Mahathir's visit to France.

Officials from the company that markets the European launcher's flights remarked: "After Thailand and Indonesia, Malaysia's choice of the European launcher, in a tough competition, strengthens Arianespace's position in Southeast Asia."

MEASAT-1 is the first satellite of the Malaysian telecommunications program. Weighing 1,400 kilograms at takeoff, it will be built by the U.S. Hughes Aircraft company on the basis of its HS [Hughes satellite] 376 platform. Rigged with 10 C-band and four Ku-band repeaters, it will provide telecommunications (telephone, telex, data transmission) services and direct digital tele-broadcasting over Malaysia, the Philippines and the south of India.

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After signing of the contract, the seventh of the year, Arianespace's order book, before the sixty-fifth launch, totals 41 satellites to be launched, or, four years of launches.

**Germany's DASA, China's CASC Create Joint Satellite Association**

*94WS0455B Paris AFP SCIENCES in French  
13 Jul 94 p 11-12*

[Article: "Creation of Joint German-Chinese Euraspac Satellite Firm"]

[Text] Munich—German Aerospace (DASA) announced that on 8 July in Munich the Chinese Space Agency (CASC) and the DASA group signed an agreement to create a joint satellite firm.

The two companies will each hold 50 percent of the mixed company, Euraspac, that will be headquartered in Munich and will start operation with a capital of seven

million German marks [DM]. The firm will develop, manufacture and market communications and earth observation satellites, plus the necessary ground facilities. CASC and DASA have projected China's and Hong Kong's demand for satellites at about 20 units over the next 10-12 years.

Juergen Schrempp, DASA's chairman of the board of directors, remarked: "This contract is the outcome of long and good relations between DASA and its Chinese partners. We start from the principle that intensive trade relations will be profitable for the Chinese and that they will continue to promote the opening up of the country."

Euraspac's first project is Sinosat-1 (with an option for a second version), a telecommunications satellite, for a Chinese operator based in Beijing, the Sino-Satellite Communications Company (SSCC). It will be used by the People's Bank of China. CASC will assemble the satellite, using components supplied by DASA.

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